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A

GENERAL SYSTEM OF SURGERY,

IN THREE PARTS.

CONTAINING THE

DOCTRINE and MANAGEMENT

I. Of Wounds, Fractures, Luxations, Tumors, and Ulcers, of all Kinds.

II. Of the ſeveral Operations performed on all Parts of the Body.

III. Of the ſeveral Bandages applied in all Operations and Disorders.

The Whole illuſtrated with Forty Copper-Plates, exhibiting all the Operations, Instruments, Bandages, and Improvements, according to the Modern and moſt approved Practice.

To which is prefixed,

An INTRODUCTION,

Concerning the *Nature*, *Origin*, *Progreſs*, and *Improvements* of Surgery; With ſuch other PRELIMINARIES as are neceſſary to be known by the Younger Surgeons.

Being a Work of THIRTY YEARS Experience.

By Dr. *LAURENCE HEISTER*,

Profeſſor of *Phyſic* and *Surgery* in the Univerſity of Helmstadt, Fellow of the Royal Society, London, and of the Royal Academy at Paris, *&c.*

Tranſlated from the Author's laſt Edition, greatly improved.

THE SEVENTH EDITION.

LONDON,

Printed for J. Clarke, J. Whiston and B. White, L. Davis and C. Reymers, R. Baldwin, W. Johnston, and H. Woodfall.

MDCCLXIII.

THE EDITOR'S PREFACE to the SIXTH EDITION.

THIS moſt excellent and elaborate Work, is ſo well known in the learned World, and has every where met with ſo favourable a Reception, that, to detain the Reader at preſent with any Encomiums on this Subject, would be vain and ſuperfluous. But, as the judicious Author (who has not only his own Credit, and the Dignity of his Profeſſion, but, what is infinitely more noble, the public Utility ever at Heart) has greatly improved and enlarged his Undertaking in ſucceeding Editions; the Proprietors of this Tranſlation have, therefore, thought it their Duty to give a freſh Impreſſion of it, enriched with all thoſe uſeful and valuable Improvements. Theſe Additions are diſperſed almoſt every where throughout the Work; but are moſt large and copious in the important Branches of Lithotomy and Midwifry.

We have likewiſe inſerted in this Edition two additional Plates, engraved from thoſe of the Author's. And, that nothing might be wanting to complete it, the whole Tranſlation has been reviſed, with great Labour and Attention, and particularly with an Eye to the Accuracy of the Pointing, which greatly aſſiſts the Clearneſs and Perſpicuity of a Work, eſpecially to the young Beginner, not yet verſed in the Subject.—Upon the whole, we flatter ourſelves, that we here offer to the Public, the moſt uſeful Work of its Kind now extant, thus carefully reviſed, and amply improved; which, on its firſt Appearance, not only led the Pupil through each Branch of the Practice, but was confeſſed, by the experienced and judicious Practitioner, to be a moſt complete, diſtinct, and comprehenſive Syſtem of the whole Art of Surgery.

Since Dr. HEISTER publiſhed his Syſtem of Surgery, he has obliged the World with a large Collection of Caſes in the ſeveral Branches of Surgery and Midwifry, which he printed in the *German* Language. This uſeful Work has been tranſlated into *Engliſh*, at the Recommendation of the learned and ingenious Dr. PETER SHAW, *Phyſician in Ordinary to his Majeſty*, who has been pleaſed, in the Preface, to declare it, to be "a very uſeful Work, containing a genuine Account of large Buſineſs, and a good Hiſtory, not only of Dr. HEISTER's extenſive Practice, but of the Improvements made in the ſeveral Parts of Phyſick and Surgery, during his own Time; and abounds with Improvements and uſeful Diſcoveries in the Courſe of his extenſive Practice, during ſeveral Campaigns, and in many popular Cities of *Germany*. His ingenious Mind ſhines through the whole, as he deſcribes not only the Caſes wherein he was ſucceſsful, but thoſe wherein he failed." And upon peruſing it, Dr. SHAW found it ſo excellent, that he recommended it to be tranſlated, believing it would prove highly ſerviceable to the Public.

London, November 1, 1756.

TRANSLATOR'S PREFACE.

THE Tranſlation of the Book before us, which now appears in the World, will obviate a Complaint frequently made among the junior Surgeons, and Pupils of this Art in *England, viz.* that they are in Want of a general Syſtem, capable of inſtructing at large one that is a Learner in Surgery, for the Execution of all the Branches of his Profeſſion; and this, till now, might indeed be affirmed with ſome Juſtice. It is true, the ſeveral Branches of Surgery have been tolerably well handled by various Authors, at different Times, and in ſeparate Treatiſes: Some have confined themſelves to Wounds, Fractures, Luxations, Tumors, and Ulcers, which make the Subject of the firſt Part of the preſent Syſtem; others have written profeſſedly on the Operations, Inſtruments, and Bandages; or miſcellaneous Obſervations appertaining to the Practice of Surgery; and others have given us ſhort Introductions to the whole; but in no one Book, except the preſent, do we meet with all theſe Branches treated in that ample, eaſy, and intelligent Manner, which is neceſſary for the firſt Information of Beginners, or the occaſional Conſultation of the more advanced. We have, in this Work, not only the beſt and moſt modern Methods of Practice uſed by the principal Surgeons of the ſkilfulleſt *European* Nations, but alſo exact Figures of their ſeveral Inſtruments and Bandages, with the Methods of uſing or applying them in all chirurgical Caſes whatever; the whole Doctrine of which is here explained in the minuteſt Circumſtances; and brought down even to the loweſt Capacities. In ſhort, no Character of the Book can ſo well recommend it to the Reader as his own Peruſal, and the Author's Preface following.

London, Oct. 1742.

THE AUTHOR'S PREFACE.

AFTER having ſtudied Phyſic with great Aſſiduity above four Years in our *German* Univerſities, my Affections, being ſtrongeſt for *Anatomy* and *Surgery*, led me to the then celebrated Profeſſors RUYSCH and RAW, at *Amſterdam*, in the Year 1706; whoſe anatomical and chirurgical Demonſtrations I diligently attended for about the Space of a Year. During which Time I was alſo employed in frequent Diſſections, and in trying chirurgical Operations upon dead Subjects; in the mean Time omitting no Opportunities of being preſent at the Performance of any conſiderable Operation by theſe Profeſſors, or by the other eminent Surgeons of the ſame City, as VERDUIN, BORTEL, KOENERDING, *&c.* By which Means, joined with an attentive Reading of the beſt Writers, I acquired a conſiderable Knowledge in Surgery.

But being deſirous of all Helps to render myſelf ſtill more expert and ſucceſsful in the Practice of this Art, there being at that Time a ſharp War in *Flanders*, betwixt the *French* and *Dutch*, in the Summer following, *viz.* in the Year 1707, I went from *Holland* to the *Dutch* Camp in *Brabant*, that I might inſpect and obſerve the Practice of the *Engliſh*, *Dutch*, and *German* Surgeons, who there attended. Thus, through many Dangers and Hardſhips, I ſpent this whole Summer in the Hoſpitals of the Camp, for the Sake of Improvement. But in Autumn I went from *Brabant* to *Leyden*, and ſpent the whole Winter in attending the Lectures of the then celebrated Profeſſors in that Univerſity, BIDLOO, ALBINUS ſenior, and BOERHAAVE: And thus I continued till the Beginning of the Summer 1708. After which, having taken my Degree of *Doctor*, I returned again to the Camp, where I found large Opportunities of learning and improving myſelf in Surgery, from the Multitude wounded, *&c.* in the ſeveral bloody Fights, particularly at the Siege of *Liſle*, and the Battles of *Audinarde* and *Wynnendale*. Upon the Approach of Winter again, I was determined to ſettle in the Practice of *Phyſic* and *Surgery* in *Holland*, at *Amſterdam*, partly from

from the Delight I had in the Country, and partly through the Sollicitations of the famous RUYSCH, who reſpected me as a Son. Here therefore I ſtayed the Winter, and Part of the enſuing Spring, teaching *Anatomy* and *Surgery* to Students and Gentlemen, as RAW had done before me, who was now rejected for his ill Conduct or Miſbehaviour.

The following Summer, in 1709, I had ſtill a ſtrong Deſire to follow the Camp, to become more and more perfect in the Practice of *Surgery*; and *Tournay* being at that Time inveſted by the confederate Army in *Flanders*, I was, by the Recommendations of my Friend RUYSCH, appointed Phyſician to the Camp-Hoſpital for the *Hollanders*. I had now an Opportunity of performing all the chirurgical Operations which offered in the Camps and adjacent Cities, which I generally executed with Succeſs. After the taking of *Tournay*, the confederate Army marched to beſiege *Mons*, near which Place the *French* Army was alſo aſſembled. That, however, did not prevent us from inveſting and taking the City; before which the numerous Army had ſuch a bloody Battle, that the Wounded were brought in upon us in Crowds. Their Number continually increaſing, from the uncommon Heat of the Combat, every Surgeon had now his Hands full of Buſineſs, and infinite Calls for the Practice of his Art: For the Wounded, on the Side of the *Hollanders* only, amounted to above Five thouſand. I had here therefore an ample Occaſion to extend the Bounds of my Practice, and was obliged to put on that Intrepidity of Mind, which CELSUS requires as an eſſential Qualification in a Surgeon; and for want of which, ſome, who are, in other reſpects, ſkillful Operators, do frequently miſcarry.

After the Army had entered into their Winter-Quarters, and the wounded Men recovered, I returned again to *Amſterdam*, where I continued my *Anatomical* and *Chirurgical* Demonſtrations this Winter as before. In the mean Time, I never refuſed my Aſſiſtance at the Operations of the other Surgeons there.

But in the Beginning of the Spring following, 1710, I was, beyond all Expectation, called by the Republic of *Noringberg* to teach *Anatomy* and *Surgery*, as public PROFESSOR in the Univerſity of *Altorf*. Being therefore unwilling to neglect this honourable Invitation, having obtained

Leave from the Republic, I first made a Tour into *Great Britain*, where I was, from Spring to Autumn, collecting every thing new in the several Branches of Physic, and then, returning to *Norimberg* and *Altorf*, I assumed my new *Professorship*.

In this Station I was under a Necessity of teaching publicly, among the other Parts of *Physic*, that most ancient, necessary, and useful Branch of it which we call *Surgery*, and which I had before taught privately during the two preceding Winters in *Holland*. But in doing this I was much perplexed for want of a convenient Manual, or compendious System of the Art, to assist and inform those Learners who attended my Lectures. To our want of such a *Compendium* I also attributed the general Ignorance and Insufficiency of the young Surgeons and Students in this Branch of *Physic*, which at that Time universally prevailed, through *Germany* especially. And from the same Cause the generality of our Surgeons, being unequal to the more difficult Operations, were content with being able to cure a slight Wound, open a Vein or Abscess, or at most to set a Fracture, and reduce a Luxation; leaving those Disorders and Operations, which require the greatest Skill, to the Management of daring Quacks and itinerant Operators, with which *Germany* at that Time swarmed.

If any one examines the best Books, such as the *Microtechnia* of VAN HOORN, the *Operations* of NUCKE, *&c.* which were at that Time consulted not only by our Surgeons, but also by our University-Professors, for teaching and learning the Art, it will readily appear how imperfect and insufficient they are to give a just Notion of any one Branch, much more of the whole System or Body of Surgery. Since they describe only a few of the Operations, and those too imperfectly; taking little or no Notice of the Doctrine and Treatment of Wounds, Fractures, Luxations, Tumors, and Ulcers, which make the most considerable Part of Surgery, and in which a Learner ought to be the most fully instructed. It is true, the Works of GUIDO CAULIACUS, AQUAPENDENS, PAREY, SCULTETUS, SOLINGEN, and some other Writers of the last Century, are very full and explicit in all or most of the Operations, and the five Kinds of Disorders beforementioned. But even in these we must not expect to find the many Improvements, Emendations, and Discoveries, made by the Moderns: And their Practice being mostly

moſtly obſolete, they muſt conſequently be allowed to be unfit for the Inſtruction of Learners. And it is an Objection to many of our Books in Surgery, of a more modern Date than the preceding, that they have been either compiled by Phyſicians, little converſant in chirurgical Diſſections and Operations, as thoſe of BARBET, VERDUC, BONTECK, DOLEY, BLANCARD, CHARRIERE, JUNCKEN, VAUGUION, LE CLERC, *&c.* in which many of the old Errors are continued, and not a few Things ſtated otherwiſe than will be found in Practice: Or elſe they have been reſtrained to but one or two Subjects only, as the Bones, Wounds, Tumors, Bandages, Operations, *&c.* beſides their being written either in a rude, or a foreign Language, unknown to moſt of our Surgeons.

Theſe were chiefly the Motives that firſt induced me to attempt the Compoſition of a chirurgical Syſtem, to be ſubſervient to my own Lectures and Auditors: In doing which, I endeavoured to take in all the more uſeful Part both of our ancient and modern Writers in every Branch of Surgery; rejecting what appeared uſeleſs or obſolete, and comparing or correcting the whole conformably to my own Experience, and what I had ſeen in the Practice of the Art under many of the moſt ſkilful Surgeons and Phyſicians. And thus, from time to time, I endeavoured not only to correct and complete my Collections and Remarks, ſo as to take in every, even the minuteſt, Part of Surgery; but alſo I digeſted and diſpoſed the whole in the Method which appeared to me the moſt natural, and the beſt adapted both for the Teacher and Learner.

Theſe my firſt Labours I writ originally in *Latin*, in which Language they were alſo delivered to my Hearers, and permitted to be *tranſcribed* by them: But, conſidering the immenſe Fatigue that this Method of obtaining it gave the Student, with the great Loſs of Time, which he might have otherwiſe employed to more Advantage, I was at length determined to *publiſh* it in *Latin*, in the Manner I had then compoſed it. Yet ſo great was the Ignorance of our *German* Surgeons, at that Time of Day, as well in the *Latin* Tongue as in their own Profeſſion, that (my Work) being chiefly intended for them, I now judged it would be more uſeful to print the Book in our native *German*; for then both the learned, and ignorant of the *Latin*, might have the ſame Benefit of it. Accordingly I tranſlated and ſent it to the Preſs in the Year 1717, and in the Year following, 1718, it was publiſhed

as

as my *Surgery*, in 4*to*, at *Norimberg*, being illuſtrated with Copper-plates, exhibiting the beſt Inſtruments, *&c.* And from this time it is that we have had better or more expert Surgeons in *Germany* than before; many of which have ſince often declared to me, that they had drawn moſt of their Knowledge from my Surgery.

I intended, ſoon after, to have publiſhed the Book in *Latin*, for the Sake of *Foreigners*; but, in the Year enſuing, I received a moſt gracious Call to the public Profeſſorſhip of *Anatomy* and *Surgery* in the *Julian* Univerſity of *Helmſtadt*, from his *Britannic* Majeſty, as Duke of *Brunſwick* and *Lunenburg*, under whom the Univerſity flouriſhes, and is liberally ſupported; ſo that what with the Care and Trouble of packing up, and removing my Goods, and the Fatigue of a long Journey, added to the Multitude of Buſineſs, and many Avocations conſequent on my new Office, I have been obliged to delay the *Latin* Edition of my Surgery much longer than I ever thought or deſigned. However, the *Germany* Impreſſion was ſold off in a little Time, and the Bookſeller urging for a ſecond Edition, as there were ſeveral Improvements made lately in *Surgery*, particularly in *Lithotomy*, I therefore reviſed, corrected, and enlarged the Book, according to the later Diſcoveries, and my own recent Obſervations ſince made, ſo as to fit it then for a ſecond, and ſome time after for a third Edition. But then this, with other Avocations in the mean time, prevented me from compleating the Work in the learned Language, for the better Sort of Readers, ſo as to make it correſpond to the Performances of foreign Authors, with which our *German* Surgeons were unacquainted.

But being at length ſollicited, as well by many learned Phyſicians and Surgeons of other Nations, as by my Bookſeller at *Amſterdam*, to publiſh my Surgery in *Latin*, for the Advantage of Foreigners; and being unwilling to deny the Requeſt, I have now, notwithſtanding my academical and practical Buſineſs, made ſhift to print it in that Language, in many Places much enlarged and amended beyond any of the preceding Editions. And I hope it may be a Means of inſtructing young Surgeons in all the Branches of their Profeſſion, according to the beſt modern Diſcoveries and Improvements which have been made in the Art. I have here endeavoured to preſent them with the whole Body of Surgery together, that Learners eſpecially may not have their

Knowledge to ſeek in many different Books, by turning over ſome upon Wounds; others upon Fractures, Luxations, Tumors, or Ulcers; and others, again, upon Operations, Inſtruments or Bandages: All which, I think, are here ſufficiently explained, not only for the Inſtruction of Learners, but all the Purpoſes of the more advanced.

Whether I have ſucceeded in this Taſk, muſt be left to the Determination of more prudent and impartial Judges; but this I may be allowed to ſay, that I have uſed my beſt Endeavours to promote the Glory of God, and the public Good, by theſe Labours of their

Devoted Servant,

Helmſtadt,
Jan. 10, 1739.

THE AUTHOR.

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A GENE-

A GENERAL

INTRODUCTION

TO

SURGERY.

Of the Nature, Conſtitution, Origin, Progreſs, Improvement, and Diviſion of SURGERY ; *and of other Things in general, which are principally neceſſary for* STUDENTS *in* SURGERY *to be acquainted with.*

I. THE principal end of *Phyſic* is to prevent or relieve the Diſorders of the human Body. This the firſt Phyſicians endeavoured to effect by three means, either by *Food*, *Medicines*, or the *Application of the Hand*[a]; or by all together, if the Caſe required it: which method, reaſon and experience teach us, is abſolutely neceſſary at this time. And of theſe three branches of this ſalutary Profeſſion, they called the firſt *Diet*, or *Dietical* (διαιτητική); the ſecond *Pharmaceutical* (φαρμακευτική); and the third *Chirurgical* (χειρουργική). For ſince the end of *Phyſic* could by no means be always obtained by *Diet* and *Medicine* alone, (though they are of very great ſervice in preſerving and reſtoring the Health of Mankind), but Manual Operation is alſo found ſometimes to be abſolutely neceſſary; it is plain therefore that this branch of *Phyſic*, which is called *Surgery*, is very neceſſary to mankind: more eſpecially, as it appears, that by this means many grievous Diſorders are relieved, as Wounds, Fractures, Luxations, and ſeveral others, where *Diet* and *Medicine* would afford very little, and ſometimes no help at all. But that the excellence and neceſſity of this Art may appear more clearly, it may be neceſſary to obſerve, that other Arts only conduce to the conveniencies of life, but the Art of *Surgery* is frequently neceſſary for the preſervation of life, and the continuance of health, the moſt valuable treaſure we can be poſſeſſed of. This neceſſity appears more particularly in dangerous Wounds received in war, ſkirmiſhes, or ſieges[b], where many brave men muſt neceſſarily periſh

[a] See CELSUS, Præf. Lib. I. pag. 3. Edit. Almelov. & Patav.

[b] Of the Uſe and Excellency of Surgery, ſee VESALIUS, in præfat. Corp. Hum. fabric. GESNER, in Script. opt. Chir. CYPRIAN, Orat. encom. in Chirurg. SCHELLAMER, Præf. de Tumor. and KESSELRING, in Diſſert. de meth. *Fourbertian*, who treats very learnedly of the flouriſhing State of Surgery, and contends, that it is equal, if not preferable to, Phyſic, from the great Certainty and Rationality of its practice.

from loſs of blood, and other cauſes, unleſs they were reſtored, and ſnatched as it were from the jaws of Death, by the ſkill of their Surgeons. And no doubt the better opinion the Soldiers conceive of their Surgeons, the more ſpirits have they for the combat, having good confidence that the Wounds they receive ſhall be properly treated, and their Lives preſerved. And from hence, becauſe Surgery is chiefly exerciſed in the treatment of Wounds, it is called by the *Germans* the cure for wounds *(Wund-Arzeney)* not as if Wounds were the ſole objects of *Surgery*, but as it is of more particular and frequent ſervice in caſes of that kind.

Surgery, what.

II. "*Surgery, ſays* CELSUS[a], is that branch of Phyſic which informs us how "to cure or prevent Diſorders by the aſſiſtance of our Hands or Inſtruments, "or by the application of external Remedies," as diſorders are frequently prevented by Bleeding, Scarifying, opening of Iſſues, and by Setons, *&c.* Since therefore *Surgery* is properly the Work of the Hand, it is very juſtly called by the *Greeks* Χειρουργία, from the two *Greek* words of that ſignification, Χεὶρ and Ἔργον· from whence the perſon alſo ſkilled in this Work was called a *Chirurgeon*. But He, whoſe office it is to cure diſorders only by adminiſtring Medicines internally, and by preſcribing rules for the regulation of the Diet, is at preſent in *Latin* called *Medicus:* though this is a modern diſtinction, and unknown to the Ancients, among whom both offices were peformed by the ſame perſon, called Ἰατρὸς; as appears plainly by the writings of HOMER, HIPPOCRATES, CELSUS, and many others.

It may be called a *Science* and an *Art*.

III. Some call *Surgery* a *Science*, others an *Art:* but, in my opinion, it will claim either appellation. For it may be called a *Science*, becauſe the Student in Surgery, before he is ſkilled in the method of healing, muſt have acquired the Precepts or Foundation of what is to be done towards diſcovering and remedying diſorders that are to be relieved by the Aſſiſtance of the Hand, from *Anatomy*, *Phyſics*, and *Mechanics:* for without this knowledge he would not only go very idly to work, but would do more harm than good to his Patients, and conſequently to the Public. It alſo well deſerves the name of an *Art*, when any one is ſo well verſed in the Elements of this Art, that he is able to preſerve the Body ſound, as well as to relieve it when it is otherwiſe. Hence we very properly term thoſe ſkilled in the *Art* of *Surgery*, who are expert in healing Wounds, replacing fractured and diſlocated Bones, and underſtand the right methods of treating other Diſorders which require the aſſiſtance of the Hand or Inſtruments. From hence, I imagine, aroſe the diſtinction which ſome have made between *theoretical* and *practical Surgery*. Thus *Surgery* was conſidered, when ranked under the firſt denomination, as a *Science:* as when a man has learnt and underſtands the Rules, and the Reaſons upon which thoſe Rules are grounded, which teach the beſt Methods of treating Diſorders that call for the *Surgeon's* hand, and in what manner *Operations* (as they are vulgarly called) are to be performed; but never attempts the performance of any of theſe *Operations*, whether they are dividing, amputating, cauteriſing, or reducing Bones, or of any other kind. This *Science* we call *Medical Surgery*. And this branch of *Surgery*, at leaſt, all *regular Phyſicians* ought to be well acquainted with; that they may be of ſervice to the *Surgeons* and their *Patients*,

[a] Lib. I. Præfat. pag. 3. and Lib. VII. in the beginning of the Preface.

by

by being able to give prudent advice in diſorders of this kind. *Surgery*, when it falls under the ſecond denomination, and is termed *practical*, ſignifies the exerciſe of it, or the *Art* of performing Chirurgical Operations, of replacing, tying, cutting, extirpating, dividing, cauteriſing, *&c.* The *Practical Surgeon* is well inſtructed in the art of managing his Hands and Inſtruments dextrouſly in the performance of ſuch Operations as the neceſſity of the caſe ſhall require. Much the greater part of the modern *Phyſicians* have been content with the knowledge of the former part of *Surgery*, leaving the execution of the latter, which is much to be lamented, to unſkilful Quacks and [a] Montebanks. This happens partly becauſe the Diſorders that are curable by the prudent adminiſtration of Medicines internally, and a well-regulated Diet, which more immediately come under the province of the Phyſician, are ſo numerous, and withal ſo intricate, as to be a ſufficient exerciſe for his whole Study; and partly becauſe Cures which are to be performed by the Hand, eſpecially thoſe which are attended with danger or ſeverity in the execution, require a ſingular fortitude and firmneſs of reſolution; or, as the elegant CELSUS expreſſeth it [b], A Mind intrepid, diveſted of Tenderneſs, and unmoved by the Shrieks of the ſuffering Patient: Which is to be met with in very few, though they may be perfectly well acquainted with every thing that ought to done. But whoſoever deſires to be a perfect *Surgeon*, muſt be a thorough Maſter of his Profeſſion under both heads, as a *Science* and as an *Art:* and in ſuch a manner that the *theoretical* Part, or knowledge of the Elements, (in which *Anatomy* claims the firſt place) ſhould precede the exerciſe of the Art. For if any one ſhould be bold enough to proceed in the contrary method, and invert this rule, by undertaking to perform Operations, eſpecially thoſe of the more difficult kind, before he had made himſelf well acquainted with *Anatomy*, the nature of Diſeaſes, and what is proper to be done towards removing them; of neceſſity he will do great harm to thoſe entruſted to his care, and deſtroy more than he will ſave; though this is unhappily every where practiſed by bold daring Fellows, to the great detriment of mankind, and to the diſgrace of this truly noble Art. For "Knowledge [c] ought to direct the Hands, and ſhew them what is proper for "them to perform." Therefore if any *Surgeon* has been long in Practice, and, as they are fond of terming it, is a *Man of great Experience*, and is not thoroughly verſed in *Anatomy*, and the Inſtitutions of *Surgery*, his actions are always doubtful and uncertain, and are ever obnoxious to multiplicity of dangers. Therefore it is neceſſary for the good Surgeon to be a thorough Maſter of both; but he whoſe comprehenſive Knowledge takes in all the other branches of *Phyſic*, as many amongſt the ancient and modern *Phyſicians* have done [d], is by ſo much the abler and more accompliſhed *Surgeon.*

IV. The end of *Surgery*, as appears by what we ſaid above at N° I. is three- The end of Surgery.
fold: 1. *To preſerve mankind in a ſound State*, in the manner we explained it at

[a] This is very rarely the caſe in *England*, but too common in *Germany*.
[b] Lib. VII. in Præfat. [c] CELSUS ſpeaks more largely of this Lib. I. in Præfat.
[d] As ÆSCULAPIUS, PODALIRIUS, MACHAON, HIPPOCRATES, GALENUS, CELSUS, ÆTIUS, ÆGINETA, ORIBASIUS, GUIDO CAULIACUS, SALICETUS, VESALIUS, FALLOPIUS, MARIANUS SANCTUS, JO. DE ROMANIS, VAROLIUS, CABROLIUS, FABR. AB AQUAPENDENTE, M. A. SEVERINUS, HILDANUS, SPIGELIUS, GLANDORPIUS, GEIGERUS, SCULTETUS, MARCHETTUS, ROLFINCIUS, WEPFERUS, MURALTUS, SOLINGENIUS, RUYSCHIUS, BIDLOUS, NUCHIUS, GROENVELTIUS, CYPRIANUS, BOHNIUS, BRUNNERUS, RAVIUS, LEUSDENIUS, &c.

N° II. 2. *The Reſtitution of a ſound State*; that is, the cure of diſeaſes by the Aſſiſtance of the Hands. Or, 3. *To preſerve the Life of a Man*, though with a maimed and wounded Body, if it is impoſſible to render it entire. This third end is chiefly obtained by the amputation of ſphacelated, cancerated, or carious Limbs; ſo in Cancers, Schirrus's, old Ulcers, and other ſuch like incurable Diſeaſes, and in ſeveral Diſorders of the Head, eſpecially in weakneſſes of the Eyes and Ears, to prevent their growing worſe, it is uſual to order Iſſues, Setons, frequent Blood-letting, Bliſtering, *&c.* though a perfect Cure is not perhaps to be looked for. And therefore under this head may be ranked inveterate *Herniæ*.

Auxiliaries of Surgery, what.

V. The *Auxiliaries* or *Means* which *Surgery* makes uſe of to obtain the ends we have been diſcourſing of, are chiefly the *Surgeon's Hands* and proper *Inſtruments*. For as often as a fractured or diſlocated Bone is to be reduced, a Vein to be opened, a Stone to be extracted, or a Cataract depreſſed, proper Inſtruments are always neceſſary. But that every thing may go on with more ſpeed, eaſe, and ſafety, the adminiſtration of proper internal Remedies, and the regulation of Diet, will never be neglected, in any of the foregoing caſes, by a prudent *Surgeon*; which confirms the ſaying of Celsus, "[a] That all the parts "of Phyſic are ſo intimately connected, that it is impoſſible to ſeparate any "one of them entirely from the whole." And in another place[b], "I, *ſays he*, "can eaſily conceive one man to be capable of performing all the offices of "Phyſic, and, where they have been divided, think him praiſe-worthy that "unites them in himſelf."

Origin of Surgery.

VI. The ſtrong connection that there is between *Phyſic* and *Surgery*, is, in my opinion, a perſuaſive argument that the Origin, Progreſs, and Fate of both, were always the ſame. Though, to ſay truth, I cannot help believing with Celsus[c], and others, that *Surgery* is more ancient than any other branch of *Phyſic*, and near coeval with Mankind, and therefore the true Parent of *Medicine*. The nearer Mankind was to its firſt original, at ſo much the greater diſtance were they, as Celsus obſerves, from Luxury and Debauchery, and of conſequence ſo much the farther removed from internal Diſeaſes. The native ſtrength of Man, as yet unhurt by Intemperance, ſtood in no need of internal Aids. But on the other hand, even in the earlieſt times, Men were as liable, as we are to this day, to external Injuries, which require the aſſiſtance of the *Surgeon's* Hand. For who in thoſe days was ſecure from falling, or from Fractures of the Bones, which are the conſequences of ſuch accidents; from the Bites of wild Beaſts; or from the Wounds of an open or an inſidious Enemy? Since in the very firſt Ages men waged war with each other, can it be reaſonably ſuppoſed that they were always free from Bloodſhed, fractured and diſlocated Bones, *&c.* As therefore it cannot be doubted, but that by the direction of Nature, who taught them to extract Thorns, and to tie up Wounds, to prevent a large Effuſion of Blood, they by degrees were uſed to receive aſſiſtance from the hand of ſome kind of Inſtruments; and if by chance, after many repeated experiments of this kind, any thing ſhould be found to anſwer the deſired end, diligent Men would certainly retain it in their Memories, and mark

[a] In Præfat. Lib. V. item Scribonius Largus, Cap. LXVIII. [b] In Præfat. Lib. VII.
[c] In Præfat. Lib. I.

it down. which being repeated with ſucceſs in ſimilar caſes, was handed down to poſterity. So this ſalutary Profeſſion took its riſe from ſmall, and thoſe rude, beginnings and vulgar Experiments, till by degrees it received Improvements, and was brought to its preſent perfection by the Induſtry and Sagacity of ingenious Men.

Improvements of *Surgery* in *Greece*.

VII. By as much as we can collect from ancient Hiſtory, the *Chaldeans* and *Egyptians*, who were the firſt cultivaters of Science, as we learn from the Scriptures, found *Surgery* naked and in her infancy, enriched her with new Experiments, and laid her down Rules and Inſtitutions to walk by. And afterwards [a] *Surgery* was ſtill much farther enriched by the *Greeks*, thoſe ancient and noble Patrons of Knowledge. Apollo and his Son Æsculapius were chiefly celebrated as Surgeons in thoſe ages, who for their Sagacity in cultivating this Science, gained to themſelves ſo great Applauſe, that they were reckoned among the number of the Gods. After theſe came Podalirius and Machaon, two ſons of Æsculapius, who accompanied Agamemnon to the *Trojan* War, and were of great ſervice to the Army. But Homer never takes notice of them as being ſerviceable in the Plague or other kinds of Diſtempers, but only as Perſons ſkilful in healing Wounds by the application of Inſtruments and Medicines. From whence it appears, that they were only expert in *Surgery*, and that it is the moſt ancient Branch of *Phyſic*. We read of Chiron the *Centaur*, and other *Surgeons* after them, who equalled them in reputation, but the monuments of thoſe days are long ago entirely defaced by time. Hippocrates the *Coan* ſeems to have far exceeded all the reſt in ſagacity and ſucceſs; Celsus declares of him, "that he was not only celebrated "for Wiſdom and Art, but for Eloquence alſo." He inherited *Surgery* by deſcent, being ſprung from the race of Æsculapius. With no leſs judgment than aſſiduity he formed a compleat Syſtem of the Experiments and Rules of his Anceſtors, with their various and elaborate Methods of Cure; which he greatly improved, through the aſſiſtance and directions of Democritas, by his conſtant and indefatigable attention to the ſtudy of *Human Anatomy* [b]. For which reaſon, they are by no means deceived who have pronounced Hippocrates the Father of all Branches of *Phyſic*, but more particularly of *Surgery*. The Writings of this great Man, notwithſtanding they are the moſt ancient, ſo far exceed all the reſt, that at all times they have been laid down as examples to all *Profeſſors* of *Phyſic*.

Proficiency of the *Romans*, *Greeks*, and *Arabians* in *Surgery*.

VIII. The *Greeks*, by their ſtrenuous application to the ſtudy of *Surgery*, excited a deſire in the *Romans*, and at the ſame time in the *Egyptians*, to give encouragement to the ſame Art. "[c] About this time, a little before the "birth of CHRIST, Philoxenus was eminent in *Surgery*, who, according "to Celsus, wrote ſeveral Volumes upon this Branch of *Phyſic*. Gorgonus "alſo and Sostratus, and Herones, and the two Apollonius's, and Ammonius Alexandrinus, and many other famous men, all enriched this "*Science* with ſomething new. At *Rome* alſo, *ſaith the ſame Author*, there "were Profeſſors of great note, eſpecially Tryphon the Father, and Euelpistus the Son of Phleges, and, as we may gather from his Writings, the

[a] Vide Cels. Lib. I. Præf. [b] As Celsus teſtifies, Lib. I. Præf. [c] See Celsus in Præf.

"principal

" principal of all, MEGES; all of them by various Emendations ſtill added " Improvements to this *Science*." But the Writings of theſe men are not tranſmitted to us. In the Ages next after CHRIST, CELSUS acquired the greateſt name amongſt the *Latin Writers*, (on whom we have beſtowed repeated Encomiums) but among the *Greek Writers*, GALEN, PAULUS ÆGINETA, ÆTIUS, and ORIBASIUS; whoſe Works are ſtill extant. But after this, in the ſubſequent ages, the barbarous Nations began to over-run the whole Earth, and *Surgery* was ſo far from encreaſing, that it received the ſame fate with all other Branches of *Science*, and ſuffered under the common calamity. Therefore it is no wonder that thoſe times produced no one to whom *Surgery* was indebted, if you except only RASES, HALY ABBAS, ALBUCASIS, and AVICENNA, who flouriſhed in *Arabia* about the XIth or XIIth Century. It is to be obſerved though by the way, from GUIDO DE CAULIACO[a], the *Phyſicians* at this time firſt refuſed to undertake the performance of any *manual Operation*, though indeed in CELSUS's time there were ſome who ſeparated *Surgery* from *Phyſic*.

Induſtry of Surgeons of a later date.

IX. In the XIIIth and XIVth Centuries, when the clouds that had overſhadowed all Science began to diſperſe, *Surgery* alſo again emerged with the reſt, and was cultivated both by *Phyſicians* and *Surgeons*. At firſt aroſe BRUNUS, THEODORICUS, SALICETUS, LANFRANCUS, ARNOLDUS DE VILLA NOVA, and many others equally eminent: but afterwards, in a ſtill more conſpicuous light, ſhone that true Reſtorer of *Surgery* GUIDO DE CAULIACO, DE LARGELATA, JO. DE VIGO, VESALIUS, FALLOPIUS, ANDREAS A CRUCE, ARCAEUS, MARIANUS SANCTUS, ANGELUS BOLOGNINUS, BERENGARIUS CARPUS, ALPHONSUS FERRIUS, JOANNES TAGOLTIUS, BARTHOLOMAEUS, MAGGIUS, PARAEUS, SCHILLLHANS, GERSTOFF, BRUNSVIC, RYFF, and others, who greatly contributed, as appears by their Writings, to the Improvement of *Surgery*.

Of the Moderns.

X. At length in the laſt and preſent age, by the induſtry firſt of the *Italians*, *French*, *Germans*, and more latterly alſo of the *Engliſh*, *Surgery* has been ſo wonderfully enrich'd with extraordinary Inventions and Obſervations in *Anatomy*, *Mechanics*, and *Phyſics*, and with elegant Inſtruments and new methods of Curing, that it ſeems to want little or no addition to raiſe it to its higheſt ſtate of Excellency and Perfection. But although I purpoſed now to give a regular account of thoſe by whoſe labours *Surgery* has gained the fruits it at preſent enjoys, yet ſince the number of thoſe is ſo large, let it ſuffice for the preſent to reckon up the principal of them; leaving the enumeration of the reſt to another opportunity. In this rank we may reckon FABRICIUS AB AQUAPENDENTE, FABRICIUS HILDANUS, M. A. SEVERINUS, SPIGELIUS, MARCHETTUS, GLANDORPIUS, JO. SCULTETUS, FELIX WURTZIUS, GUILLEMEAU, CÆSAR MAGATUS, CASP. TALIACOTIUS, GOUSMELINUS, RONHUYSIUS, VAN NEEKEREN, CORN. SOLINGEN, NUCHIUS, BURMANNUS, MAURICEAU, TOLET, VERDUCCIUS, BIDLOUS, RUYSCHIUS, BOHNIUS, CYPRIANUS, RAUIUS, MASSIERUS, DIONIS, PETIT, WISEMAN, DOUGLAS, CHESELDEN, GARENGEOT, MARINUS, TURNER, MORAND, LE DRAN, and many others, whom you will find among the *Chirurgical* Writers.

[a] See his Chirurgical Works.

XI. Be-

XI. Before we proceed farther, I think it will be of service to the Students in Surgery, to inform them of the best Writers that have treated of particular parts of *Surgery*, and have either handled these separately, or at least with superior success: in describing of these I shall observe, as near as I can, the same order, in which this book is disposed. And first, the following Authors have treated of *the five principal parts of Surgery*, to wit, *Wounds*, *Fractures*, *Luxations*, *Tumors*, *and Ulcers*; VESALIUS, TAGULTIUS, ANDR. A CRUCE, FABRIC. AB AQUAPENDENTE, then CORTESIUS, PECCETIUS, WISEMAN, MUNNICK. Writers on particular parts of *Surgery*.

XII. The following Writers upon *Wounds* in general well merit reading; PARÆUS, ARCÆUS, FABRICIUS AB AQUAPENDENTE, GLANDORPIUS, MAGATUS, BELLOSTIUS. Upon *Wounds of the Head* in particular; HIPPOCRATES, CELSUS, CARPUS, ARANTIUS, PAVIUS, MILLERUS, SCHULTZIUS, WALTHEPUS, and ROHAULT, a modern *Frenchman*. On *Diseases of the Eyes*; FALLOPIUS, Jo. LANGIUS in *Ephemerid. N. C. Cent.* V. & VI. ST. YVES. On *Wounds of the Breast*; FUMANELLUS, PECHLINUS. *On Gunshot Wounds*; PLAZZONUS, MAGGIUS, FERRIUS, ROTA, PARÆUS, FALLOPIUS, GUILLEMEAU, HILDANUS, BOTALLUS, BURMANNUS, TASSIN, VERDUC, VAUGUION, CHARRIERE, and, tho' last, not the least eminent, LE DRAN. Of *Tents*; BAIETUS. Of the *Abuse of Tents in Wounds*; MAGATUS, BELLOSTIUS, and a late *French* piece of CHABERT'S, and of LUPUS in *Italian*, who have maintained that Wounds should seldom be kept open by Tents. Useful *Observations on Wounds* have been published by SCULTETUS, BELLOSTIUS, SCHWARTIUS, DE LA MOTTE, CHABERT, LE DRAN: The best discourses on *Mortal Wounds*, and the method of discovering them to be so, have been written by BOHNIUS, TEYCHMEYERUS, ZACCIAS, AMMANNUS, VALENTINUS, ZITTMANNUS, FRID. HOFFMANNUS: To the same purpose is a book whose title is, *The Art of forming Prognostics in Surgery*, in *French*, and BLEGNIUS upon the same subject. Authors on Wounds.

XIII. On *Fractures* and *Luxations*; PARÆUS, AQUAPENDENS, HILDANUS, VERDUC, in a particular volume on this subject; LE CLERC in his *Osteology*; PETIT'S *Art of curing the Diseases of the Bones*, in *French*; PALFINUS, in *Dutch*. On *Fractures of the Cranium*; HIPPOCRATES, CELSUS, CARPUS, BERENGARIUS, CORTESIUS, PAAW, and the Authors above recited, who have discoursed on Wounds of the Head. On Fractures and Luxations.

XIV. On *Tumors*; INGRASSIUS, FALLOPIUS, ARANTIUS, SAPORTA, M. A. SEVERINUS, SCHELHAMMER, CALVERS, MAUBEC, in *French*. On *Suppuration*; LAZERME. On *Abscesses*; SEVERINUS. On the *Carbuncle and Pestilential Bubo*; FALLOPIUS, GEMMA. On *Œdema and Schirrus*; HARRIS. On *Fungous Tumors of the Limbs*; SLENOGTIUS. On *Gangrene and Sphacelus*; HILDANUS, KOENERDING, HARRIS. On *Burns*; HILDANUS. On a *Cancer*; ALLIO, GENGRON, HELVETIUS, HARRIS, and much earlier TEXTOR. On *Ulcers*; TAGAULTIUS, BONONINIUS, FALLOPIUS, AQUAPENDENS, VERDUC, LE CLERC. On *Caries of the Bones*; PETIT. On a *Spina Ventosa*; SEVERINUS, PANDOLPHINUS, MARCHETTUS, and WALTHER, in *High Dutch*. Of Tumors and Ulcers.

XV. The best Authors on *Chirurgical Operations* in general, are CELSUS, ÆGINETA, PARÆUS, FABR. AB AQUAPENDENTE, SOLINGEN, NUCHIUS, VERDUC, VAUGUION, CHARRIERE, DIONIS, PAFYNUS, MASSIERUS, GARENGEOT, MARINUS, LE DRAN, SHARPE. On Chirurgical Operations.

XVI.

Of Blood-letting, and Operations of the like nature.

XVI. On *Bleeding* in particular, besides many others, you will find Botallus, P. P. Magnus, Schmid, Jondot, Verna, Mellius, Crone, Harris, Silva, Chevalier, Hecquet, Quesnay, Martin. On *Bleeding oftener in the Jugular Vein*; Tralles. On the *Aneurism*; Bartholin, Horn, Harris. On *Infusing Humours into the Blood*; Major, Ettmuller, Elsholzius. On *Transfusion*; Lower, Sturmius, Santinellus, Mafridus, Marklinus, Burmannus.

Of Operations which are performed on various parts.

XVII Of *Inoculation of the Small Pox*; Maitland, Pilarinus, Le Duc, Vaterus, Wreden, Harris, Of *Cupping and Scarifying*; Celsus, Galen, Magnus, Botallus, Mannus, Mellus. Of the *Abuse of Cupping in Putrid Fevers*; Aquapendens. Of the *Egyptian Method of Scarifying*; Alpinus, Stahlius. Of *Leeches*; Galen, Magnus, Heurnius, Stahlius. Of *Puncture with a needle after the manner of the Japonese*; Rhyne, and Koempflerus. Of *Issues*; Galvanus, in *Italian*; Glandorpius, Restaurant, and Schoretus, in *High Dutch*. Dissertations on this subject have been written by Albinus, Schellhammerus, Schacherus, Fr. Hoffmannus, Hilscherus, and others. On *Cantharides*; Geyerus, Albinus, Wedelius. On the *Use of Blisters*; Caius, Nenterus, Fr. Hoffmannus, Laetius a Fonte, and Hercules Saxonia. On *Cauteries*; Albucasis, Capivaccius, Gavassetius, Severinus, Costæus, Magnus, Fallopius, Fienus, Bartholinus, Bauhinus, Slevogtius. On the method of using the *Indian Moss (Moxa)*; Ten Rhyne, Cleyerus, Valentini, Le Temple. Of *Atheromata* and *Steatomata*; Gortesius, Jo. Langius, Elsholstius. Of the *Meliceris*; Hildanus, Sebizius. Of *Encystated Tumors*; Slevogtius. Of *Extracting foreign Bodies from Wounds*; Bidloo. Of *Amputation of the Limbs*; Fienus, Hildanus, Hoffmannus, Hilscerus. Of *a new Method of taking off Limbs*; Jonge, Verduin, Ruyschius, Koenerdingius, Salzmannus.

Operations on the Head.

XVIII. Of *an Issue upon the Coronal Suture*; Slevogtius. Of *Arteriotomy*; Fienus, Severinus, Alpinus, Scheurlius. Of the *Hydrocephalus*; Cortesius. Of *Trepanning*, and particularly of the difficulties that attend that Operation; Fienus, Bohnius, Coschwitzius.

On the Eyes.

XIX. Of *Disorders of the Eyes*; Bartischius, who has very accurately delineated many of the Diseases of the Eyes; Guillemeau, Read, Coward, Maitre Jean, Kennedy, St. Yves. Of the *Trichiasis*; Heister. Of *Scarification of the Eyes*; Manchartus, Platnerus. Of the *Fistula Lacrymalis*; Anellus, Heister, Mellius, in *Italian*, Platnerus. Of a *Cataract*; Maitre Jean, Brisseau, Wolhusius, Heister, Widemannus, Marinus. Of the *Hypopion*; Bidlous, and Mauchartus, who likewise published treatises on the *Ectropion*, the *Fistula in the Cornea*, the *Empyesis*, and other Diseases of the Eyes.

On the Nose and Mouth.

XX. Of a *Polypus of the Nose*; Glandorpius. Of the *Hair Lip*; Marinus. Of *Disorders of the Teeth*, and the Methods of remedying them; Guillemeau, Strobelbergerus, Crone, and Frauchard, a *Frenchman*, who lately wrote a Treatise called *Le Chirurgien Dentiste*. Of the *Epulis and Parulis*; Schellhammerus.

On the Neck and Breast.

XXI. Of *Laryngotomy*; Casserius, Moreau, Fienus, Dekkerus, Monavius, Fontanus, Massierus. Of *Strumæ and Scrophulæ*; Laurentius, Browne, Gibbs. Of *Setons*; Gulyanus, Jo. Francus, Wedelius, Metzgerus.

GERUS. Of the *Cancer of the Breasts*; see above, under the Head *Cancer*. Of *Gibbosity*; WEDELIUS.

XXII. Of a *Paracentesis*; there are several academical Theses extant upon this Subject, by MEIBOMIUS, ALBINUS, SLEVOGTIUS, HENNINGERUS. Of the *Cæsarean Birth*; ROSSETUS, BAUHINUS, DOERING, HILDANUS, BULEAU, RAYNAUDUS, FIENUS, LANKISCHIUS, CYPRIANUS, SLEVOGTIUS. Of *Herniæ*; PETRUS FRANCUS, GEIGERUS, LE QUIN, LAUNAY, BERENGER, VON HAMMEN, WIDEMANNUS; HARRIS, HOUSTON, in *English*; JO. SERMES, in his Book of *Lithotomy*, in *Dutch*, and divers academical Theses; in particular upon the *Hernia Incarcerata*, by MAUCHART; on the *Crural Hernia*, by KOCHIUS; on the *Enterocele*, by ROLFINCIUS and PETERMANNUS; on the *Sarcocele*, by MARINUS; on the *Hydrocele*, by the same; and on the *Abuse of Kelotomy*, HEISTER. On the Abdomen.

XXIII. Of a *Phimosis* and *Paraphimosis*; WEDELIUS. Of the *Closure of the natural Passages*; WIERUS. Of *Imperforations*; WEDELIUS. Of *Hypospadiacs*; LAVATERUS. Of *Passing the Catheter*; MEIBOMIUS, MARINUS. Of a *Stone in the Urethra*; MARINUS. Of a *Caruncle in the Meatus Urinarius*; FERRIUS, LACUNA, BENEVOLUS. Of *Fistulæ in the Urethra*; HILDANUS, MARCHETTUS, BECKERUS. On the Parts of Generation.

XXIV. Of *Lithotomy, and particularly of what they call the great Apparatus*; MARIANUS SANCTUS, HILDANUS, TOLETUS, GROENFELD, ALGHISIUS, MARINUS, CALLOTUS. Of *the lesser Apparatus*; CELSUS, ALBUCASIS, CAULIACO; but it was afterwards laid aside; yet not long since MARINUS, an *Italian*, defended it in some particular cases, though by others it is altogether rejected. Of *the High Apparatus*; PETRUS FRANCUS, ROSSETUS, JO. DOUGLAS, CHESELDEN, MIDDLETON, MORAND, J. SERMES, PROEBISCHIUS, and HEISTER. Of FRERE JACQUES's *Method*; MERYUS, LISTERUS, DIONIS. Of RAU's *Method*; ALBINUS, HERTIUS, and JAC. DENYSIUS. Of the *Lateral Operation*; JAMES DOUGLAS. Of *the different Methods of cutting for the Stone*; PYE, an *Englishman*, and LE DRAN, a *Frenchman*; and SCHEFFERUS, and HERTIUS, in their Academical Theses, and others. Of FOUBERT'S *Method*; KESSELRING. Of *the Methods of curing the Stone*, invented by FOUBERT, GARENGEOT, PARCHET, LE DRAN, and LE CAT; GUNZIUS. Of *the Abuse of Tents after Lithotomy*; HILDANUS. Of *the Puncture of the Bladder in a Suppression of Urine*; MARINUS, MEYERUS. Of Lithotomy.

XXV. Of *the Art of Midwifry*; among the Ancients, RUPEUS, RUEF, RHODIO, PARÆUS. Among the Moderns; SCIPIO MERCURIUS, MAURICEAU, PEU, PORTAL, VIARDEL, VOELTERUS, SIGISMUNDA, a Midwife of *Brandenburg*, DEVENTER, DIONIS, MELLIUS, ST. AMAND, DE LA MOTTE, HOORN, SUECUS, WIDEMANNIA. Of *the Method of extracting a dead child*; HIPPOCRATES, SOLINGEN, FONTANUS, and the Authors we have just recited. Of *the bearing down of the Womb*; BECKIUS. Of the Art of Midwifry.

XXVI. Of *Clysters*; LANZONUS, SWARTZIUS. Of *the Fistula of the Anus*; MARCHETTUS, LE MONNIER, GLADBACCIUS, BASSIUS. Operations on the *Anus*.

XXVII. Of *the Paronychia*; GLANDORPIUS, WEDELIUS, ALBINUS. Of *the Suture of the Tendons*; KISNERUS. Of *Clefts in the Feet*; WEDELIUS. Of *Ingrafting*; TALIACOTIUS, SALTZMANNUS. On the extreme Parts.

On Bandages.

XXVIII. Of *Bandages*; Galen, translated by Vido Vidius, with Figures; Paræus, in his Surgery, Part III. Verduc on *Bandages* in *French*, and Solingen; but the best Writers of all are Le Clerc, in his *Appareil Commode*, and Bassius in *High Dutch*, and Ulhornius. Of *Chirurgical Instruments* you may consult Oribasius, Paræus, and Scultetus.

Writers of Observations.

XXIX. Of *Observations in Surgery*; the best are related by Paræus, Hildanus, Scultetus, Marchettus, Tulpius, Meckeren, Roonhusius, Lambswerdius, Ruyschius, Bellostius, Purmannus, Saviardus, De la Motte, Chabert, Le Dran.

Miscellaneous Writers.

XXX. Of *the Principal Controversies in Surgery*, consult Fienus. On *the Duties of a Surgeon in the Army*, read Franc. de Roma, Muraltus, Schmid, Tassin, Purmannus, Bellostius, Abeille. Of *Surgery in the Time of a Plague*; Purmannus. Of *Chirurgical Anatomy*; Gerga, Cheselden, Palfinus. Of *Medicines used in Surgery*; Hollerius, Pigræus, Wurtzius, Hildanus, in his Tract *de Cistâ Militari*, Ettmuller *de Chirurgiâ Medicâ*, Le Clerc, Verduc de Fasciis, and Belliost *in Pharmaciâ Chirurgicâ*. *Chirurgical Instruments* are best described by Albucasis, Andr. a Cruce, Hildanus, Guillemeau, Fabr. ab Aquapendente, Paræus, Scultetus, Solingen, Massierus, Dionis, Heister, and Garengeot.

Knowledge of Languages necessary to a *Surgeon*.

XXXI. Since many of the most valuable Treatises in Surgery have been published in the Learned as well as in the Modern Languages, it will easily appear of what great Service it will be to the Surgeon, to be well versed in those Languages, especially the *Latin* and *French*, since without this Assistance they will reap very little advantage from the Inventions of others: but whoever is moderately versed in the *Latin* Tongue, I would advise him to procure the Academical Theses upon Chirurgical Subjects which are yearly published, for the Expence is trifling, and the Advantage that accrues from reading them, is by no means so; for they frequently contain many new and useful Observations, Descriptions of Instruments and Machines, and new Methods of Cure, that are not to be met with in larger Volumes.

Division of *Surgery* into its Parts.

XXXII. Hitherto we have treated of the Nature and End of *Surgery*, described the Aids that are necessary to it, and related the Fortunes it has met with in different Ages; Order therefore now requires us to proceed to its Division, which is very different according to different Authors. There are many Professors of *Surgery* who divide this Art into six parts, and distinguish each of them with a *Greek* Name. These are, 1. *Synthesius*. 2. *Diæresius*. 3. *Exæresis*. 4. *Aphæresis*. 5. *Prosthesis*, and, 6. *Diorthosis*. On the other hand, some divide it into five, some into four, some into three parts, whilst others assert that it may be comprehended under two of these Divisions. But since Persons ignorant of the *Greek* Language are easily puzzled with *Greek* Terms, and besides that the Distinctions are not just, as not comprehending all parts of *Surgery*, it seems to be high time to abolish them, as we live in an Age, more inquisitive after things than words: more especially as these Terms would perplex the Memory of young Students in Surgery, who for the most are unacquainted with the *Greek* Language. Some, lastly, have been fond of dividing Surgery into five parts, the first treating of Wounds, the second of Ulcers, the third of Fractures, the fourth of Luxations, the fifth of Tumors. Though even this

Method of dividing by no means satisfies me, since the whole Art cannot be clearly explained, by speaking to each of these Heads.

XXXIII. Wherefore in my Judgment, it is best to divide *Surgery* into the three following Parts, by which means the whole Art may be laid down and taught with Clearness. The first, which is called *Pentateuch* by FABRICIUS AB AQUAPENDENTE, from the number of Chapters it is comprised in, treats of the Disorders that are most common to the Human Body, and takes up five Books. 1. *Of Wounds.* 2. *Fractures.* 3. *Luxations.* 4. *Tumors,* and, 5. *Ulcers.* The second Part treats of *Chirurgical Operations*, (as they are commonly called) describing at the same time all such Disorders of the Human Body as are to be relieved by the Assistance of the Hand, and could not properly be described in the first Part. Lastly, *Chirurgical Bandages* will be the subject of the third Part, which we shall describe in so clear a manner, that it will be very easy to learn not only how each of them is to be made, according to the Nature of the Disease or of the Limb, but also how they are to be applied, to the Benefit of the Patient; for though we find that *Surgeons* have paid very little regard to the Descriptions of Bandages in their Writings, it is nevertheless not only extremely useful, but absolutely necessary. Sometimes Accidents happen of such a Nature, as Luxations, Fractures, Hæmorrhages, Herniæ, as only to admit of Help by Bandages, and where without such Assistance the Cure would be extremely doubtful or desperate; besides this, by a neat and dextrous Application of a proper Bandage, the Surgeon not only gains the Admiration of the Standers by, but his Patient also puts more Confidence in him, which very often forwards the Cure wonderfully.

The Author's Division of Surgery.

XXXIV. Lest any one should be ignorant of the Method which I intend to observe in expounding the Chirurgical Doctrines which I am going to lay down, I shall give a brief Description of it in this place. That those who are desirous of acquiring a thorough Knowledge of *Surgery* may not be disappointed, I shall not, according to the Custom of many others, content myself with solely describing the Instruments and Machines that are made use of by Surgeons to relieve suffering Nature, neglecting at the same time the History of Diseases, and the Regulations that are to be observed with regard to Diet and Medicine, as if they were not things necessary for the Surgeon to be acquainted with; but, on the contrary, I shall use the utmost Diligence to explain, as clearly as it is possible, 1. The proper Nature and Disposition of the Disorder. 2. What Parts of the Body are liable to be affected by this or that Disorder. 3. What the peculiar Symptoms of each Disorder are, and how to form a proper Prognostic by them. 4. I shall describe the principal Chirurgical Instruments which are best adapted to each Case, of which you will find Copper Plates, for the most part of the same size with the Instruments which they represent. 5. I shall not only shew the best Method of performing all Operations in Surgery; but, 6. in what manner the Patient is to be treated after the Operation, so as to recover his Health in the most speedy, safe, and pleasant manner; and this not only with regard to the Dressing and Bandages which are to be applied to the Part, but also with respect to the Medicines which are proper to be administred, and the Rules which are to be observed as to his Diet.

The Author describes the Method that he intends to follow in Writing.

The Knowledge of Instruments is recommended, and a Supply of them promised.

XXXV. We declared above that a Surgeon's Hands would be of little Service to him, if he was not supplied with Variety of Instruments, which he ought to be very well instructed in, that ever hopes to arrive at a proper use of them in the Cure of Diseases. Therefore that we may the more readily form our Surgeon, it will be well worth our while to treat briefly of the necessary Apparatus of Instruments which he is to be furnished with, before we are sollicitous about teaching him the manner in which they are to be used. I cannot deny but that there are a great number of Chirurgical Instruments to be found in Chirurgical Authors; but, at the same time, I can with truth affirm, that many of them are obsolete and useless, and many of excellent use have been omitted, (especially at the Time when I first published my Book of Surgery in the *German* Language in the Year 1718.) therefore it seems necessary to publish a Description, not only of the most modern Chirurgical Instruments, but of those best adapted to use, keeping up to their proper size as much as possible in the Plates. Whether our Plates have satisfied this end or not, let others judge: this I am certain of, that I have made it my study to save Students in Surgery the Labour of having recourse to many Volumes to search after proper Instruments, and to exhibit to their View all the best and most general Instruments in one Book; and in some places they will find Copies of Instruments which are not to be found in other Authors. Garengeot published a Book in *French* on Chirurgical Instruments, in which he exhibited many new and correct ones, but delineated in too small a size, which easily led Surgeons and Workmen, who endeavoured to imitate them, into Errors; the chief of these I have copied into this Book, and, wherever my Page would admit of it, I have given you the true Dimensions of the Instruments, in order to render them more useful. But as it is of much more service to examine the Instruments themselves than the Plates of them, therefore a Surgeon ought to neglect no Opportunities of examining and contemplating upon the best he can lay his hands on, and especially the newest invented. For my own part, when I read Chirurgical Lectures, I always shew my Pupils all kinds of Instruments that are used in Surgery, and point out the Defects of the Ancients, and the Improvements of the Moderns.

Pocket Instruments described.

XXXVI. But in the first place, as they are more immediately necessary, and are in constant use, I shall describe the Instruments in their true Dimensions, which a Surgeon ought always to carry about him in a proper Case, and are therefore called *Pocket Instruments*. To this place belong those Instruments in particular, which are described in Plate I, under the Letters A and B; *two Lancets* of different sizes. These are used, especially the smaller sort, in opening Veins, for which reason the *Greeks* called them *Phlebotoma*; but the larger sort are used to open Abscesses with, and are therefore called by the *French Lancettes à l'Abces*. The Letter C shews a pair of *strait Scissors*, fit for many uses; the Surgeon should have several pair of these at home, of different sizes, as they are necessary in different Disorders. D, a pair of *crooked Scissors*, proper to be used in dividing *Fistulæ*, and in many other cases. E, a pair of *Forceps* furnished with Teeth at one End; these are used to remove Dressings, and sometimes to extract Splinters or Thorns; they are also serviceable to the Surgeon in his Anatomical Exercises. *Forceps* of this kind are commonly made of Steel, but those of Silver are much neater. F, a *Razor*; G, a *strait Incision Knife*,

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Knife, by the *French* called *Biſtouri*; H, a *crooked Inciſion Knife*; I, a *ſtreight double-edged Inciſion Knife*; K, a *Probe*, which the *French* call *Une Sonde*; one End of which is broad and thin, for diſcovering a Fiſſure in the *Cranium*, and other uſes; the other End is rounded with a Nob, to examine the Depth and Situation of Wounds and Ulcers: for which uſes alſo the Probe at Letter L may ſerve. The neateſt Probes are made of Silver, though they are frequently alſo made of Steel, Ivory, or Whalebone. M, repreſents a *grooved Probe* or *Director*, to direct the Edge of the Knife or Sciſſors in opening *Sinus's* or *Fiſtulæ*, that by this means the ſubjacent Veſſels, Nerves and Tendons may remain unhurt; the Ornament at the upper part of it is for a Handle, though ſometimes that End is made in the Form of a Spoon, as you may ſee in the Figure at N, to contain a Powder to ſprinkle upon Wounds or Ulcers; ſometimes alſo it is forked at the End to divide the *Frænum* of the Tongue, as at the Letter O. Nor muſt we here omit the *Spathula*, as deſcribed at the Letter P. The uſe of this Inſtrument is to depreſs the Tongue, in order to examine the ſtate of the Tonſils, Uvula, and Fauces, when they are affected with any Diſorders; it is alſo uſed to ſuſpend the Tongue, when the *Frænum* is to be divided; for which purpoſe it has a Fiſſure at its extremity, and ſhould therefore be rather made of Silver than of any other Metal. The following *Spathulæ* alſo at Q and R, ſomewhat reſemble this: Theſe are chiefly uſed in ſpreading Plaſters, Ointments and Cataplaſms, ſometimes with their ſulcated Extremity they are of Service in raiſing up fractured Bones of the *Cranium*. Here likewiſe, in the laſt Place, we muſt remember different ſorts of *Needles*, *ſtraight* and *crooked*, for ſtitching up of Wounds, taking up of Arteries, and many other uſes: I have given you crooked ones of different Sizes at the Letters S, T, V, X.

XXXVII. What I have ſaid concerning the Inſtruments that are immediately neceſſary for a Surgeon to be provided with, is ſufficient; I ſhall proceed now to deſcribe other things, with which he is equally obliged to be furniſhed, as certain Medicines; ſuch as *Unguentum Digeſtivum commune*, *Unguentum Ægyptiacum*, *aut Fuſcum Wurtzii*; for cleanſing or digeſting foul Ulcers: and ſome vulnerary Balſam, as the *Linimentum Arcæi*, *Balſamum Samaritanum*, *Peruvianum*, *Capyvæ*, *de Mechâ*, *Unguentum Baſilicum*, *Oleum Terebinth.* or *Balſamum Sulph. Terebinthinatum*, *&c.* To theſe muſt be added a Plaſter or two, as *Emplaſtrum Diapalma*, or *Stypticum Crollii*, ſince they will almoſt always be required. Neither ſhould a Surgeon ever be unfurniſhed with a Piece of *Vitriolum Romanum*, to take down luxuriant Fleſh, and ſtop Hæmorrhages; but if you are without Vitriol, its corroſive Intention will be anſwered by *Alumen uſtum*, *Mercurius præcipitatus ruber*, or *Lapis infernalis*, or any other corroſive Medicine, which will alſo ſerve to make Iſſues or open Abſceſſes, or to perform any Work of that kind. But the Surgeon ſhould always have in readineſs a certain quantity of ſcrap'd Lint, that he may be able to give immediate Aſſiſtance to wounded Perſons; ſince, if he is unprepared, they may be eaſily taken off with an Hæmorrhage, which circumſtance ought alſo to prevail ſtrongly with a Surgeon, never to be entirely unprovided with *Bandages*.

What Medicines a Surgeon ought to be furniſhed with.

XXXVIII.

Neceſſary Qualifications for a Surgeon.

XXXVIII. We obſerved above (N. 2.) that it was the buſineſs of an able Surgeon readily to apply a Remedy to the Diſorders of the human Body by manual Operations with the Aſſiſtance of Inſtruments. We have now deſcribed the principal Inſtruments as well as Medicines with which a Surgeon muſt of neceſſity be provided. It remains therefore to examine into the Qualifications he ought to be maſter of to render him accompliſhed in his Profeſſion. The Agility of Body, and Reſolution of Mind that are neceſſary to a Surgeon, are elegantly deſcribed by CELSUS: "[a] A Surgeon (ſays he) ought to be in his full "Vigour, to have a ſtrong, ſteddy Hand, never given to tremble, and to be "as ready with his Left-hand as his Right; to have a quick, clear Sight, an "intrepid Mind, void of all Tenderneſs, ſo as not to be at all moved by the "Outcries of his Patient; to uſe no more Haſte than the Caſe requires; nor "to cut leſs than is neceſſary; but he ſhould act in all reſpects as if he was en-"tirely unaffected by his Patient's Complaints." But at the ſame time, I would have him behave with ſuch caution as not to proceed raſhly or cruelly, and particularly avoid giving unneceſſary Pain.

Agility of Body. Reſolution of Mind.

Skill in Phyſic and Anatomy.

XXXIX. The two Qualifications that I have juſt recited, are by no means ſufficient of themſelves to compleat the Surgeon; but there are others alſo which CELSUS has omitted, which are highly uſeful, and conſequently neceſſary. No one will excel in Surgery, unleſs he is firſt furniſhed with a good natural Genius, to which he muſt join a well-grounded Knowledge in Anatomy and Medicine; if he is furniſhed with theſe gifts, he will not only with great Sagacity judge of the Cauſes and Circumſtances of the Diſorders upon which he is conſulted, but will with great readineſs make uſe of the beſt Methods, both with regard to the Adminiſtration of Medicines, and the Choice of proper Inſtruments for their Relief; or, if occaſion require, invent new ones, and apply them with Succeſs: whilſt, on the contrary, they who are not Maſters of theſe Qualifications, will daily be guilty of capital Errors.

Frequent Exerciſe in Hoſpitals.

XL. When theſe ſolid Foundations for Surgery are laid, and the Qualifications attained, which we have here recommended, our Student muſt by no means omit a proper Attendance upon the Lectures of Profeſſors, and a due Diligence in reading Chirurgical Authors. Thoſe therefore who deſire a thorough Knowledge in Surgery, are not ſatisfied with viſiting Caſes that may accidentally occur to them in their private Practice, but diligently frequent all the Hoſpitals they can get Admittance to, and by this means they ſee more in one Year, than they could otherwiſe do perhaps in the whole courſe of their Lives. But in order to make the greater Proficiency in theſe Schools of Surgery, it will be worth while to diſtinguiſh the different kinds of Diſorders that fall under your Inſpection, after what Method, and with what Succeſs they are treated by Maſters of the greateſt Experience. Being prepared by repeated Obſervations of this kind, aſſiſted by the Advice of Maſters, you may at length try your Hand, at firſt upon dead Bodies, and afterwards, when you have Opportunity, upon diſeaſed Perſons; for this trite Saying will always have its Force: *The Artiſt is not made by Reading, Meditating, or Diſputing, but by Practice.*

[a] Vid. Lib. VII. Præfat.

XLI. Laſtly,

XLI. Lastly, that the Surgeon may not appear disagreeable or terrible to his Patients, especially if they are Persons of Distinction or Quality, he should diligently avoid the appearance of Roughness in his Behaviour, or Nastiness in his Dress: For good Breeding and Cleanliness have their proper Effect in all Parts of Life; but the Surgeon gains a particular Confidence with his Patient by his Address, which has no small share in the Success of his Endeavours. Good Manners and Cleanliness.

XLII. The Surgeon being endued with these Principles and Qualifications, may safely apply himself to the Practice of his Profession; but that he may succeed the better in the Execution of it, it is proper he should be acquainted with what is his Duty in every step of it. As soon as ever he is introduced to his Patient, he ought in the first place (as HIPPOCRATES well advises) to enquire of him, or his Friends or Domesticks, what ails him? where is the Seat of his Complaint? from what Cause it proceeds? and how long it has been upon him? If there is no particular Objection, he should examine the Part himself, and diligently weigh all that he has heard or seen that may give him any light into the Case, that he may come at a thorough Knowledge of the nature of the Disorder. The Surgeon's Duties to his Patient. First, he is to examine the Case.

XLIII. Having finished his Examination, the next thing to be done is to consider under what Class of Disorders it is to be ranked, and whether it be curable or not? If it is deemed curable, Whether it will be a Case of Time and Difficulty or not? whether it is curable by Medicines alone? or whether the Assistance of the Knife be necessary? for the safest and most gentle Methods, as CICERO with great Propriety observes, must always be preferred to harsh and dangerous ones, and are always to be tried first, that the patient may not suffer unnecessary Tortures, nor his Life be hazarded through the Rashness of the Surgeon; but to Disorders of a violent nature, dangerous and even doubtful Remedies are to be applied: agreeable to the saying of HIPPOCRATES, (*Aph.* 6. Sect. 8.) "Where Medicines fail, Instruments succeed." They are to be highly condemned, therefore, who, after the Methods of [a] Mountebanks, condemn their Patient who labour under *Herniæ*, without regard to Age or Habit of Body, to the Operation of the Knife, when far the greater part of them might be cured by a safer and easier Method. But if you shall find it impossible to save your Patient by gentle Methods, you should declare the Danger to the Patient, or rather to those about him, lest, if the Disorder should get the better of your Art, you should be suspected of Ignorance, or, perhaps, of Knavery. Whether curable or not, and by what means?

XLIV. If the Surgeon shall find the Disorder to be curable, but to be of such a nature as to require the Knife, he should declare this in due time to the Patient, and should have his Approbation or Consent before he undertakes it; for a Surgeon is not only to take care to stop the Fury of the Disease, and allay present Pain, but also to provide against Accidents that arise from Delay; such as may aggravate and enhance the Distemper, and at last render the Case incurable. In very difficult Cases, where Danger consists not so much He should undertake the Cure with great Circumspection.

[a] I saw an Instance of this in a Mountebank, who undertook the Cure of a Boy of about six Years of Age, for a *Hernia*, and not only performed the Operation, but castrated him: when I asked him in private, why he used this hazardous Method without trying a Truss, since his tender Age would easily have admitted of it, he ingenuously confessed he did it for Profit, for he would have been paid but a crown for the Truss, whereas the Operation brought him Ten, if not Twenty.

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in Delay, as in the manner of Treatment, the Surgeon not only provides for his Patient's Good, but his own, if he calls in other ſkilful Practitioners as well in Phyſic as Surgery, with whom he may conſult maturely and deliberately before he proceeds to any Operation; for by this means he will ſave himſelf from all blame of having proceeded raſhly or ignorantly, eſpecially when he is concerned for Perſons of Diſtinction; if things ſhould go otherwiſe than he could wiſh, he will avoid the Charge of having loſt a Patient through his Indiſcretion, whom perhaps no Art could have ſaved: Which very Reaſon ſhould always induce a prudent Surgeon, in Caſes attended with Difficulty and Danger, to deſire the Aſſiſtance, if it can be procured, of the ableſt and moſt experienced of his Fraternity.

He ſhould be furniſhed with proper Inſtruments before he begins.

XLV. Having proceeded ſo far, with the Cautions that I have adviſed, every thing ſhould now be carefully provided which is neceſſary for Inciſion, Dreſſing, or any other Action, before the Operation be entered upon; but this Apparatus of Inſtruments and Dreſſings ſhould never be got ready in your Patient's Chamber, or in his Sight, leſt they ſhould ſtrike him with a ſudden Fear, and bring on fainting Fits and other Accidents, which would very much diſturb the Operation. For the ſame Reaſon a Crowd of uſeleſs Spectators ſhould never be admitted into the Room, becauſe, beſides the Diſturbance that they create to the Patient, it is to be feared they will very much annoy the Operator, by intercepting the Light, and filling up the Room: Beſides, ſhould any one rudely preſs upon him, whilſt he is performing any nice Operation, it might be of the utmoſt ill Conſequence.

He ſhould encourage his Patient.

XLVI. When the Surgeon is entering upon the Operation, he ought to uſe his utmoſt Endeavours to encourage the Patient, by promiſing him in the ſofteſt Terms to treat him tenderly, and to finiſh with the utmoſt Expedition; and indeed he ſhould uſe Expedition but not Hurry, and ſhould be very careful to give no unneceſſary Pain, but at the ſame time to leave no Miſchief unremedied; if he obſerves theſe Rules, he will be ſure to gain Credit with the ſtanders by.

After the Operation the Wound is to be dreſſed.

XLVII. The Operation being now over, the Surgeon is to conſider what remains to be done towards ſupporting his Patient, and confirming the Cure; the Hæmorrhage occaſioned by it is to be ſtopped, the Wound to be dreſſed, the wounded Part is to be placed in the moſt convenient and eaſy Situation; and it is now time not only to think of preventing any new Diſorder falling upon the Part, but to uſe all Endeavours for reſtoring Health itſelf.

Proper Diet is to be adviſed.

XLVIII. It is his Duty now to preſcribe a proper Regimen for his Patient's Diet, to provide him a commodious Apartment in a healthy Air, to encourage him to reſt, and to avoid all Paſſions, and Reflections upon any things that may diſturb his Mind; and if any freſh Inciſion, or other Operation, be neceſſary, he ſhould be adviſed readily to ſubmit to it. Every thing ſhould be carefully avoided that may ruffle the Patient, for Diſturbances of the Mind are great Enemies to the Health of the Body.

Impertinent Viſits ſhould be prevented.

XLIX. Frequent and impertinent Viſits to the Sick, from his Friends or others, ſhould be carefully prevented, for they will undoubtedly fatigue and diſturb him; but we don't mean by this to cut him off from all Converſe with Mankind; a little chearful Company now and then would rather give him Eaſe, and make him forget his Pains; but I had much rather he ſhould divert himſelf by attending to others, than by ſpeaking himſelf.

L. Celsus

L. Celsus declared Physic to be a conjectural Art; these Conjectures therefore must be made with the utmost caution, and the Surgeon also should use the same caution in delivering his Prognostic, when he is called upon, and not, like bold Quacks, promise all will go well, whether the Case is curable or not. For should the Case turn out contrary to your Prognostic, you will either be accused of Knavery or Folly: So if we listen to Reason and [a] Celsus, it is the Part of a Mountebank to aggrandize a small Performance: an honest Surgeon will always be very careful to avoid both Extremes; it is the Part of a prudent Man to declare from his Conscience what he takes to be the true State of his patient's Case; whether he believes it to be curable or incurable; what Hopes he entertains of his Recovery; and it is particularly incumbent on him to take the utmost care, that he encrease not a Disorder, which appears slight in the beginning, by treating it negligently. In doubtful Cases, where there is reason for great Fear, but not for certain Despair, he should declare his Reasons both for Hope and Fear; but where the Case is extremely dangerous, he should do it to the Relations. Sometimes it is better not to be concerned with a Patient, when it is impossible to be of any service to him, lest you should be said to have killed him, who died by his Disease [b]: But where you are concerned, let the Case be ever so desperate, it is always the Duty of a prudent Surgeon, to cherish the Patient with sweet Words, and give him Hopes of his Recovery; for some Disorders are very much aggravated by Fear, whereas the Expectation of Health and Ease is always so comfortable, that, though it will not cure a Disease, it will at least make it easier to be born.

Great Caution is to be used in prognosticating.

LI. We have already declared what are the principal Duties of a Surgeon; but since the *First*, which is strictly to examine the Case, and the *Sixth*, which concerns the dressing of the Wound, are more immediately necessary, we shall more largely explain what Methods are to be observed both in examining and dressing Wounds. In examining and discovering dangerous and difficult Disorders, the Surgeon requires many Assistances; at first his *Eyes* are necessary to him, by the use of which he will distinguish Wounds, Ulcers, Tumours, Fractures, Cataracts, and most Disorders of the Eye, and a thousand others; but if the Case is of such a Nature that it escapes the Sight, or is not wholly discoverable by it, the Hands are to be called in aid. This happens frequently in Fractures, Luxations, Abscesses, Herniæ, *&c.* *Instruments* also are sometimes required in this place, especially *Probes*, in discovering the Situation of Wounds, Ulcers, Fistulæ, Fractures of the Skull, Stone in the Bladder, and the like. The *Ears* also are required to give their report of some Disorders; Fractures of the Bones are frequently discovered by the noise which their Extremities make when they are rubbed together; the Sense of Hearing is of so eminent Service in discovering of Stones in the Bladder, that unless the Extremity of the Catheter is heard to strike against the Stone, we are never sufficiently justified in determining a Stone to be there. Some Disorders are discovered by the *Smell*. By the benefit of this Sense we discover the State of Malignity of an Ulcer; and in difficult Births, the *Fœtus* is discovered to be dead by the great Stench that proceeds from the Womb, and this is the only Method we have of being certain in this case. We are assisted also by this Sense in acquiring an

The Senses and proper Instruments of Service in examining Disorders.

[a] Lib. V. Cap. 26. [b] Ibidem.

eaſier Knowledge of a Caries of the Bones, an ulcerated Cancer, and Diſorders of this ſort, which carry with them a peculiar Smell. If, therefore, the Surgeon has theſe Faculties in Perfection, Seeing, Feeling, Hearing, and Smelling; with the proper Exerciſe of theſe, and the Aſſiſtance of Inſtruments, he will ſeldom be at a loſs in diſcovering the Diſorder.

And Reaſon itſelf.

LII. But Caſes in Surgery ſometimes happen, where the external Senſes, aſſiſted by Inſtruments, will by no means yield ſufficient Light to their Diſcovery; but *Reaſon* and *Judgment* are alſo required: the true Nature of a Diſeaſe is traced by Reaſoning upon its various Symptoms. HIPPOCRATES, the common Parent of Phyſic, ſeems to have regarded this, when he ſaid [a], whatever eſcapes the Reach of our external Sight, ſhould be ſearched for and overtaken by the Eyes of the Mind. So when any one has had a violent *Concuſſion of the Brain*, from a Fall or a Blow, without receiving any external Hurt, he will lay ſenſeleſs, as if he were in a profound Sleep; Reaſon in this caſe will eaſily inform us, that there is an Extravaſation of Blood in the Cavity of the Cranium, and that proper Methods muſt inſtantly be uſed to make a Paſſage for it externally. Our Reaſon is of equal Service to us in an *Empyema*; for tho' in this caſe Matter is formed in the Cavity of the Thorax, from a previous Inflammation of ſome of its Contents, yet we ſhall meet with great Difficulty in diſcovering this to be the caſe, by our external Senſes; but by comparing the preſent Symptoms with the Diſorder that was previous to them, we find it neceſſary to treat the Caſe as an *Empyema*; and of this kind there are many Inſtances.

Of the neceſſary Apparatus for Dreſſings.

LIII. We are next to treat of what principally belongs to the Method of dreſſing the diſordered Parts. In this place we are firſt to ſpeak of [b] *Lint*, which is the Scrapings of fine Linen, by the *French* called *Charpie*. This may be made into various Forms, which acquire a different Name, according to the difference of their Figure; thoſe that approach neareſt to an oval or orbicular Form are called *Pledgits*, (by the *French*, *Plumaceau*) ſee *Table* II. *Letters* A *and* B. Lint made into a Cylindrical Form, or reſembling the Shape of Dates or Olive Stones, is called a *Doſſil* (in *French*, *Bourdonets*); their ſize is very different, as appears *from the Figures at* C D E. Sometimes they are ſecured by a Thread tied round their Middle, as it is expreſſed *by the Figures at the Letters* F G. It requires a good deal of Time and Experience, to acquire a proper Expertneſs in making up theſe Forms.

Uſes of ſcraped Lint.

LIV. Theſe different Forms of ſcraped Lint, eſpecially the cylindrical, are required for many Purpoſes; for they are applied, 1ſt, *To ſtop Blood in freſh Wounds*, by filling them up with dry Lint before you apply the Bandage; but if you have not ſcraped Lint at hand, you may tear a fine piece of Linen into ſmall Rags, and apply it in the ſame manner, and perhaps with a better Effect; but in very large Hæmorrhages they ſhould firſt be dipt in ſome Styptic Liquor, Alcohol, or Oil of Turpentine; or ſprinkled with a Styptic Powder; but of this we ſhall preſently treat more largely. 2dly, *To agglutinate and heal Wounds*, to which end ſcraped Lint is very ſerviceable; if it is ſpread with ſome digeſtive Ointment or Balſam, or dipt in ſome vulnerary Liquor, they alſo yield us great Aſſiſtance. They are often ſerviceable, 3dly. *In drying up Wounds and Ulcers*, and forwarding the Formation of the Cicatrix. They are uſed

[a] In Lib. de Arte. [b] CELSUS, Lib. V. Cap. 26. Num. 21.

alſo

alſo with Succeſs, 4thly, *In keeping the Lips of Wounds at a proper Diſtance*, that they may not haſtily unite, before the Bottom is well digeſted and healed. 5thly, and laſtly, They are highly neceſſary *to preſerve Wounds from the Injuries of the Air.* The ſmall portions of Lint that are tied round with a Thread (*ſee Tab.* II. *Letter* F *and* G) are chiefly uſed in dreſſing Wounds and Ulcers that are of the deeper kind, and are always applied to the Bottom of ſuch Wounds, the remaining Cavity being filled up with other Portions of Lint, not ſupplied with a Thread, and by this means we do not only provide for the immediate Removal of theſe Dreſſings, when we ſhall thing it neceſſary, but at the ſame time prevent a Poſſibility of leaving any Part of them concealed in the Bottom of the Wound. In very large Wounds, and eſpecially in Amputations of the larger Limbs, which Operations are frequently required in the Army and Navy, at times when Lint is very ſcarce, it will be ſufficient to dreſs the bare Bone and Face of the Wound with ſcraped Lint, filling up the Cavity with *Tow*, covering all with a large *Compreſs*; Figures of which you will ſee at the *Letters* H *and* I, *Plate* II. The Surgeons in former Ages formed Compreſſes of Sponge, Feathers, Wool, or Cotton, Linen being a ſcarce Commodity with them; but Lint is far preferable to all theſe, and is at preſent univerſally uſed; excepting, that in Wounds of the Thorax or Abdomen, the uſe of a Sponge may ſometimes be neceſſary to ſuck up the Blood ſpilt in thoſe Cavities.

Of *Tents* compoſed of Lint.

LV. Beſides the different Forms of Lint that we have deſcribed, there remains another, which is ſometimes uſed in dreſſing of Wounds, called *Tents*, made of Lint worked into the ſhape of a Nail, with a broad flat Head; they differ in Thickneſs and Length according to the Size of the Wound for which they are intended, as appears by the Figures *in Plate* II, *at the Letters* KLMN. Theſe Tents are chiefly uſed in deep Wounds and Ulcers. They are of Service, 1. Not only in conveying Medicines to the inmoſt Receſſes and Sinuſes of the Wound; but, 2. To prevent the Lips of the Wound from uniting before it is healed from the Bottom; to which we may add, 3. That by their Aſſiſtance grumous Blood, Sordes, *&c.* are readily evacuated. They are to be made extremely ſoft, that the Cure of the Wound may not be retarded by the Pain they would otherwiſe bring on: but that the Wound may not be kept too long, I would adviſe the Surgeon, as ſoon as he has cleanſed the Part ſufficiently, and finds the Sinuſes heal up, to leſſen the ſize of his Tents by degrees, and, as ſoon as he can conveniently, entirely to lay them aſide. I am not at all ſurprized, that many Surgeons of good name, (amongſt which are CÆSAR MAGATUS, BELLOSTE, and others) have entirely forbid the uſe of Tents; ſince to be ſure it proceeded from a total neglect of this caution in their uſe, amongſt too many of their Brethren.

Of Tents made of Linen Rags.

LVI. But there is another kind of Tents, differing from that which we juſt now deſcribed, made of Linen Rags, not ſcraped, worked up into a Conical Form, to the Baſis of which is faſtened a ſtrong Thread; the Apex of it muſt be a little unravelled to make it ſofter, that it may not become painful. The Thread is faſtened to the Baſis that it may be recovered with the greater Eaſe, if by any Accident it ſhould be forced into the Cavity of the Thorax or Abdomen (*See Plate* II, *Fig.* O.); for it is to be obſerved here, that the Tents we now deſcribe, are chiefly uſed to keep open Wounds that penetrate into the

Cavity of the Thorax or Abdomen, in order to make way for the proper Discharge of Blood, Matter, &c.

Of Spongy Tents. LVII. A third ſort of Tents remains to be deſcribed, whoſe principal Office is, not only to keep open, but to enlarge by degrees the Mouth of any Wound or Ulcer, which ſhall be thought too ſtrait, that by this Means a freer Paſſage may be procured for the Blood and Matter that was confined, and that proper Medicines may find a more ready Admittance. Theſe Tents are made either *of Sponge*, prepared in a certain Manner, or of dried *Roots of Gentian*, *Calamus Aromaticus*, &c. for theſe kind of things imbibe the Matter that flows to them, and being preſently enlarged, dilate the Lips of the Wound. Not much unlike Tents, are the ſmall *Silver* or *Leaden Tubes*, which are frequently uſed to draw off Blood, Matter, or Water from Wounds or Ulcers of the ſmalleſt Orifices; ſometimes in extracting Water from dropſical Patients, or evacuating the Urine in a puncture of the Bladder: They are made of all Sizes and Shapes, as you may ſee in *Plate* II, *at the Letters* P Q R S T V X. What farther concerns the Uſe of theſe Tubes, you will ſee more largely treated of, when we ſhall deſcribe the Diſorders that more immediately call for their Aſſiſtance.

Of Plaſters. LVIII. Your Apparatus for Dreſſings will be very deficient if you are not furniſhed with *Plaſters*. The meaning of the Term is ſo well known, that I ſhould appear ridiculous if I went about to explain it. But there are different Kinds of Plaſters without number; the principal of theſe, and the manner of making them, may be learnt from various Books, as particularly, the *Auguſtan Diſpenſatory*, the *London*, the *Pruſſian*, and that of *Lemery*. Theſe Plaſters are ſpread upon Linen or Leather, according to the different Circumſtances of the Wound, Place, or Patient. If the Part upon which the Plaſter is to be laid is naturally hairy, it muſt be ſhaved; that it may ſtick the cloſer, and be removed without pain to the Patient: But for the better Application to different Parts of the Body, the natural Shape of the Part muſt be conſulted, and the Plaſter formed accordingly: Therefore ſome Plaſters aſſume a Round, Square, Triangular, Elliptical, or Lunar Form; others the Shape of the Letter T, &c. as will clearly appear at *Plate* II, *Numb.* 1, 2, 3, 4, 5, 6, 7, 8: Others there are which are divided at one or both Ends, *See Numb.* 9, *and* 10. To theſe we may add thoſe kind of Plaſters which are perforated near the Middle, ſome with a ſingle, ſome a double Perforation, which are of frequent Uſe in Fractures attended with a Wound; for by this Contrivance the Wound may be cleanſed and dreſſed without removing the Plaſter, *See Number* 11. Such Plaſters are uſed too, eſpecially thoſe with the ſingle Perforation, in making Iſſues or removing Warts and other Excreſcencies, by corroſive Medicines.

The Size and Uſe of Plaſters. LIX. The *Size*, as well as Form of Plaſters, is very various, ſince it muſt always correſpond with the Part which is bruiſed or wounded. Their *Uſe* alſo is of great Advantage in defending Wounds and Ulcers from the external Air, or from any Filth which they might otherwiſe contract; for they are not only ſerviceable in ſecuring the Dreſſings, but they alſo forward the Maturation of the *Pus*, agglutinate and heal Wounds, unite broken Bones, heal Burns, aſſuage Pain; and, laſtly, ſtrengthen the weaker Parts.

LX. It is frequently the Cuſtom, after the Plaſter and other Dreſſings are applied, to cover all with a *Compreſs*, which is made of the ſofteſt old Linen, four, ſix, or eight times doubled, without Seam or Hem; theſe are of ſervice, not only by preſerving the Parts more ſafe from the Injuries of the external Air, but alſo for the better ſecuring and fixing the Plaſters and other Dreſſings. Compreſſes are alſo frequently applied, where no Plaſter is made uſe of, and that, ſometimes dry, ſometimes wetted with certain Liquors, which are ſuppoſed to be ſtrengthening, reſolving, lenient, emollient, or cooling; they are frequently dipped in Decoctions of certain Herbs, into Wine, Spirit of Wine, Water, Vinegar, or Oxycrate, and ſometimes into Lime Water; and theſe are either adminiſtred cold or hot, as the Circumſtances of the Caſe ſhall require. The antient Phyſicians called them *Splenia*, from their Shape, frequently reſembling the Spleen. Of Compreſſes.

LXI. When you come to enquire after the *Figure* and *Size* of *Compreſſes*, you will find as great variety as you did amongſt Plaſters; many of them are *Square*, (*See Plate* II. *N.* 12.) others are *Oblong*, and not unlike the Spleen, *N.* 13.) again, others *Triangular*, (*N.* 14.) others reſemble the Form of a *Croſs*, (*N.* 15. according to their Situation, ſome are called *Strait*, others *Oblique*, others *Tranſverſe*, others *Annular*, as when they ſurround the Arm, or Foot. There are others again in the Form of an *Aſteriſm*, (*N.* 16.) ſome are divided either on one or on both Sides, as far as the Middle, (*N.* 17, 18.) ſometimes they form a *Hexagon*, (*N.* 19.) or are *Round*, or *Globular*, reſembling a Ball; theſe are uſed in Luxations of the *Os Humeri*, and are placed under the *Axillæ*, (*N.* 20.) ſometimes Compreſſes of a much ſmaller Size are required, which are either *Square*, (*N.* 21.) and are uſed in Wounds of the Blood-veſſels, to reſtrain Hæmorrhages, or *Taper*; (*N.* 22.) when they are called for in Sutures of Wounds, or in Ligatures of the Arteries. But all of them, of what Shape ſoever, ſhould be ſomething larger than the Plaſters they are deſigned to cover. The Shape and Size of Compreſſes.

LXII. Compreſſes of all Kinds are intended for theſe Purpoſes; 1. To preſerve and cheriſh the natural Heat of the Body. 2. To ſecure the Dreſſings that lie under them. 3. To convey liquid Remedies to Parts wounded, or otherwiſe diſordered, and to prolong the Uſe of them. 4. To fill up any Cavities or Depreſſions of the Parts, that the Dreſſings, (eſpecially in Fractures) may be applied with greater Security. 5. To prevent Bandages from bringing on a troubleſome Itching, or other Pain or Uneaſineſs upon the Skin. And laſtly, 6. to ſtop Hæmorrhages. Uſe of Compreſſes.

LXIII. But it is now high Time to ſpeak of *Bandages*, ſince they are ſo neceſſary a Part of the *Apparatus* in dreſſing and binding up of Wounds. They are not only of greater Service than Compreſſes and Plaſters in ſecuring the other Dreſſings, but are alſo of excellent Uſe in reſtraining dangerous Hæmorrhages, and in joining fractured or diſlocated Bones. Though I have ſet aſide the third and laſt Part of this Work purely for the Deſcription of Bandages, where you will find them more fully and accurately treated, I thought it nevertheleſs neceſſary to touch ſlightly upon theſe things that are principally neceſſary to a Surgeon, by way of Introduction. Of Bandages.

LXIV. Almoſt all Bandages, that are uſed in Dreſſings of Wounds, Ulcers, fractured or diſlocated Bones, ſhould be made of clean Linen Cloth, ſoftened by Wearing, but ſtrong. They ſhould be of a proper Length and Breadth; and, that it may be the ſtronger, examine the Courſe of the Threads, and tear the Cloth. Of what Materials they are to be formed.

Cloth lengthways; Darns, Seams, and large Hems in the Linen ſhould be avoided as much as poſſible, that no Inconvenience may be brought on by the Roughneſs and Irregularity of the Rowler. The proper Size of Bandages we ſhall deſcribe more fully below.

Some Sorts of Bandages deſcribed.

LXV. There are different Sorts of *Bandages* for different Uſes. Some are *common*, others *proper*; theſe are only applied to particular Parts, thoſe may be applied to any Part. So we may diſtinguiſh them into *ſimple* and *compound*; the *ſimple* are thoſe that are formed of one intire Piece of Linen, the *compound* of ſeveral Pieces of Linen ſewed together in different Manners. The moſt ſimple of all is not rolled up, and is the Bandage uſed in Phlebotomy, *See Letter a, Plate* II. That at *Lett. b*, ſeems next to this, which is rolled up at one End, and is from thence called the *ſingle-headed Bandage*, as thoſe are called *double-headed* which are rolled up at both Ends, *See Plate* II, *Letter c.* Next to theſe come other Bandages which are made out of one Piece of Linen, but divided at both Ends almoſt as far as the Middle, *See Plate* II, *Lett. d.* Theſe are called by the Surgeons *four-headed Bandages.* The Bandage at *Letter e* is ſomewhat ſhorter and narrower, and is divided at one End, and perforated at the other; this is generally uſed in Dreſſings that are applied to the Penis, or one of the Fingers. The *Letter f* deſcribes a double-headed Bandage, divided about the Middle, which is called the *uniting Bandage*, from its Uſe, for it ſerves to unite Wounds that are made lengthways, without Suture. The *ſcapular Bandage*, which (as appears at *Letter g*) is provided in the Middle with an opening, through which the Head may eaſily be paſſed, the extreme Parts of the Bandage hanging one over the Breaſt, the other over the Back. The chief uſe of this Bandage conſiſts in this, that in dreſſing Wounds of the *Thorax* or *Abdomen*, it is capable of ſupporting another Bandage that is ſomewhat wider, made of a Cloth four or ſix Times doubled, and bound round the Breaſt or Belly; as will appear more clearly from what you will read below.

Of the T Bandage of *Heliodorus.*

LXVI. There remains ſtill to be deſcribed a compound Bandage, made of two Pieces of Cloth, almoſt in the form of the Letter T, as you ſee it deſcribed at *Letter h*; its upper Part is brought round the Belly and faſtened by a Knot, but the lower Part paſſes under the Body between the Thighs, and being brought up again, is faſtened to the upper Part upon the Back. Theſe Bandages plainly appear to be deſigned for the Security of ſuch Dreſſings as ſhall be thought proper to be applied to the *Anus*, or *Parts of Generation.* Some, from the Inventor, call it *Heliodorus's Bandage*; from its Shape it is called the T *Bandage*; and ſometimes, from the Diviſion that is frequently made in the lower part of it, it is called the *double* T.

The Explanation of the Second Plate, *which exhibits thoſe Things which are principally required in Dreſſings, taken chiefly from* Dionis.

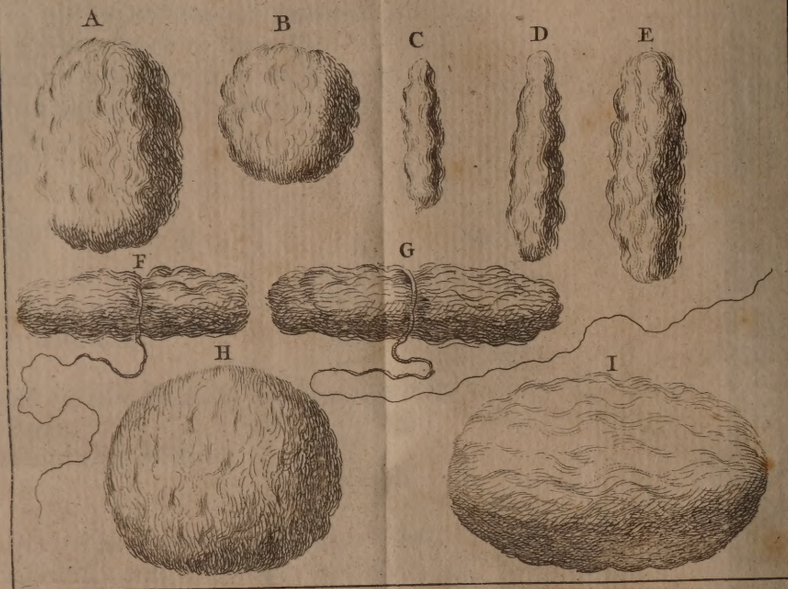
1. *Of* Pledgits, Tents *and* Compreſſes.

A and B, *Scraped Lint*, commonly called *Pledgits*, of an orbicular or oval Figure.

C D E, *Doſſils*, which are compoſed of Lint, worked into the Likeneſs of Olives, or Dactyle Stones.

F and G, the ſame, with the Addition of a Thread tied round them.

H and I,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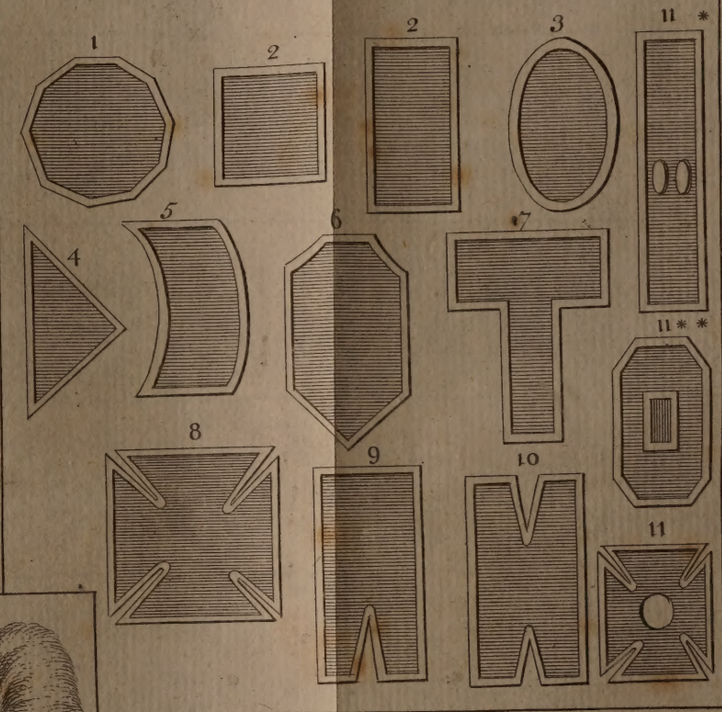
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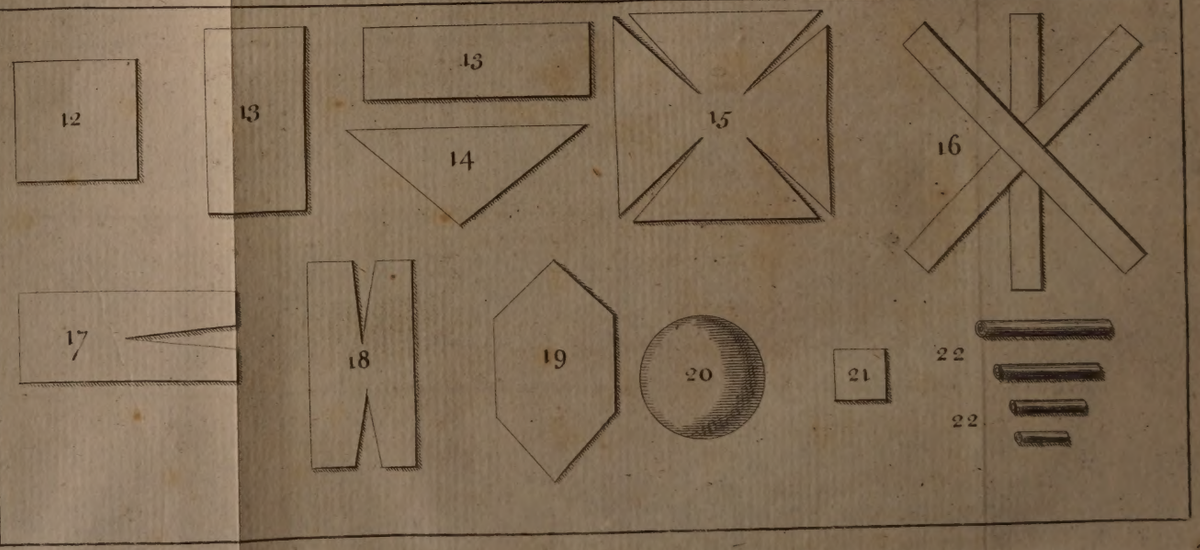
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H and I, *larger Pledgits* made of Tow.
K L M, repreſent *Tents* of different Sizes made of Lint.
N, ſhews you a very large *Tent*, with a Thread annexed to it.
O, a *Conical Tent*, ſtill larger than the former, made alſo of Lint.
P Q R S T V X, *Tubes* of different Kinds made of Silver or Lead.
Number 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11. different Forms of *Plaſters*.
Num. 12, 13, 14, 15, 16, 17, 18, 19. different Sorts of *Compreſſes*.
Num. 19. three Sorts of *Compreſſes*, reſembling the Form of an Aſteriſm.
Num. 20. Balls of Lint, which are ſometimes uſed as *Compreſſes*.
Num. 21. A ſmall ſquare *Compreſs*.
Num. 22. Several ſmall ſlender *Compreſſes*.

Of Bandages.

a, A ſimple *Bandage*, not rolled up.
b, A *Bandage of one Head*; that is, rolled up at one end.
c, A *double-headed Bandage*, rolled up at both ends.
d, A *four-headed Bandage*.
e, A ſmall *Bandage*, particularly intended for the Security of Dreſſings that are applied to one of the Fingers, or the Penis.
f, The *uniting Bandage*, which is perforated in the Middle.
g, The *Scapular Bandage*.
h, *Heliodorus's*, or the T *Bandage*.

LXVII. Though Surgeons have formerly invented different Kinds of Bandages, for every Wound that could be inflicted upon the Head; yet there is but one Form that ſeems neceſſary, and that will anſwer every End that can be propoſed from this kind of Application. This is made in the following Manner: Take a Handkerchief, Napkin, or any ſquare Piece of Linen, double it up in a triangular Form, and apply it, as we frequently do in hot Weather, when we lay aſide the uſual Coverings of the Head, to moderate the exceſſive Heat of the Sun. The Bandage which is ſo much in Uſe amongſt the modern Surgeons, called by the *French*, *Le grand courechef*, differs very little from this, and is commonly made of a Napkin, or ſome ſoft Piece of Linen, in a ſquare Form. It is doubled in ſuch a Manner, that the lower Part is about four Fingers Breadth wider than the upper; the middle Part of this Cloth is placed ſo upon the Head, that the fore Part may reach almoſt as far as the Eyes, the four Extremities or Corners of it hanging over the Cheeks. The two Corners of the upper or narrower Part are to be tied under the Chin, at the ſame Time the Corners of the lower or wider Part are to be brought towards the back Part of the Head, and tied together, or faſtened with a Needle and Thread. The fore Part that was extended towards the Eyes, is turned back as far as the Crown of the Head; the two Parts that hang over the Neck almoſt to the Shoulders are alſo to be turned back, and faſtened behind the Ears with a Needle and Thread. This kind of Bandage, when it is neatly made, ſticks cloſe to the Head, and is an excellent Contrivance to preſerve it from the Injuries it might receive from cold Air; for which reaſon it is at preſent in great Uſe and Eſteem. You may in ſome Meaſure form an Idea of the Appearance it makes upon the Head by conſulting *Plate* III, *Fig.* 1, *Letter* A.

The moſt common Bandage for the Head.

But

But the Method of applying it must be learnt from some skilful Artist; for it will easily appear, from this one Instance, how difficult it is to describe the Art of applying Bandages, by Words, and how impossible it is to learn it from such Descriptions.

Application of the Scapular Bandage.

LXVIII. *Letter* B, *Plate* III, *Fig.* 1, describes a Bandage which is generally used to secure Compresses and other Dressings that are applied to the Breast or Belly. The manner of preparing this Bandage is described above at *Sect.* 65; therefore in this Place it remains only to shew the most convenient Method of applying it. After the Wound is dressed, take a double Cloth, and wrap it round the Abdomen or Thorax, sewing not only the Ends of the Cloth strongly together, but fastening it also in the same Manner to the Extremities of the Scapular Bandage, to prevent it from slipping down; the Manner in which it is done appears very plainly in *Plate* III, *Fig.* 1, *Lett.* B *and* C.

The Bandage for Phlebotomy.

LXIX. The *Letter* D shews the Bandage or Ligature that is used to Veins of the Arm; E, to those of the Foot; but we shall treat more largely of the Manner of preparing and applying them in the third Part of our Chirurgical Institutions.

Names of the most simple Windings of the Bandage.

LXX. We have this farther to add, concerning simple Bandages; they assume different Names, according to the different Windings that they form in the Manner of applying them: For instance, if a simple Bandage with one Head surrounds an injured Part with one direct Course, it is called *annular*, *orbicular*, or *circular*. On the contrary, if the Windings of the Bandage ascend or descend equally in a spiral Manner, they are called *obtuse* or *spiral*; this frequently happens in Fractures, and other Kinds of Disorders, and is of very eminent Service. But when the Limbs which are to be bound in this Manner are of different Thicknesses in different Parts of them, which is the Case of the *Tibiæ*, it requires a good deal of Art to prevent the Windings of the Bandage from hanging loose. The Bandage is to be applied to the *Tarsus*, and to be brought upwards so as to cross the *Malleoli*, rolling it round the *Tibiæ* in a spiral Manner; but when you are come up to the Calves of the Legs, each round of the Roller must be turned in a particular Manner, and tightened according as the Case requires. It is much easier to communicate this Manner of turning in the Roller at each Round, than to describe it in Words. Consult in this Place *Plate* III, *Fig.* 1, *Lett.* F. But from what has been said, you will easily conceive the Reason why the Windings of the Bandages that we have been describing, are generally said to be inverted, and by the *French* are called *Renversées*. These Bandages are so managed that the Windings of the Roller are contiguous to each other; but there is another Method of rolling in Use, where the Windings of the Bandage are not so frequent, and keep a greater distance from each other, and are therefore called *creeping Bandages*, in the *French* Schools *Rempans*; an Example of which you may see in the left Arm of the last mentioned Figure, at *Letter* G. These creeping or serpentile Bandages are used to secure Compresses, Fomentations, or Cataplasms upon a diseased Part. Lastly, there are Bandages called by the Surgeons, *Containing*, *Uniting*, *Dividing*, or *Expelling*, from their several Uses and Intentions.

Where the Bandage ought to begin and end.

LXXI. But lest any one should be ignorant of the neatest and most proper Way of applying these Bandages, you are diligently to observe what follows; to wit, when the Arm is to be dressed, the beginning is formed by two or three circular

circular Windings on the Wriſt, aſcending by looſe Spires to the Cubit or Shoulder as the Caſe ſhall require; but when the beginning is to be on the Foot, it is to be formed by three or four circular Windings of the Bandage round the *Tarſus* and *Metatarſus*, then proceeding in a ſerpentine Courſe up to the Knee, or, if the Caſe requires it, up to the Head of the Thigh, and then, as it ſometimes happens, deſcending again. But we ſhould not neglect to mention in this Place, that the beginning of the Bandage is ſometimes applied even to the diſeaſed Part, as in ſeveral Kinds of Fractures; ſometimes near it, above it; or below it, and ſometimes at a great diſtance from it, according to the Diſpoſition of the Wound. On the contrary, the Extremity of the Bandage is ſcarce ever faſtened upon the diſeaſed Part, but rather upon a ſound one, to avoid giving Pain [a]. Upon the whole, we muſt inculcate this general Admonition; that, whatever the Caſe be, whether Wound, Fracture, Luxation, or Amputation, your Bandage be neither too looſe, nor too tight; for looſe Bandages do not confine the Parts enough: and, when they are too tight, they may cauſe not only violent Pains, but Inflammations, Tumors, Gangrene, and Mortification.

Of Chords, Bands, Ligatures and Strings.

LXXII. The neceſſary Apparatus for Dreſſings ſeems by no means complete without *Ligatures*, *Chords*, *Bands*, and *Strings*, and theſe of different ſorts, ſome fine, others coarſe, ſtrong, made either of Flax, or Hemp, or Cloth, or Silk, or Horſe-hair, according to the nature of the Diſorder; for theſe things are almoſt conſtantly required. We uſe them to replace, or extend Bones that are broken or diſlocated, to tye the Patients down, in Lithotomy, Amputations, and Operations of that kind; to tye up the Veins in Phlebotomy, to tye up Arteries after Amputations, or in large Wounds; to ſecure the Splints that are applied to Fractures; to tye up the Proceſſes of the Peritoneum with the Spermatic Veſſels in Caſtration; and laſtly, in taking off Warts and other Excreſcences by Ligature, and in all other Operations of this kind, as we ſhall more fully explain below.

The Study of Surgery is very difficult.

LXXIII. What we have already ſaid concerning the Qualifications which every Surgeon ought to be indued with, and of the Inſtruments with which it is neceſſary for him to be furniſhed, is ſufficient for this place, by way of Introduction to the following Work. We may evidently draw this concluſion from the foregoing Diſcourſe, that Surgery is no eaſy Art, but affords a large Field for Enquiry, and is not to be attained without great Aſſiduity and Labour. The Surgeon has not only a vaſt number of Diſorders to encounter, but the means by which every kind of Diſorder is to be ſubdued are almoſt infinite, the particular nature of which muſt be known to the greateſt Exactneſs. But I by no means diſcourage any one from theſe Studies by the Difficulties that I here ſpeak of, for there is nothing, according to the old Proverb, but what is to be overcome by Induſtry. I would rather adviſe Students in Surgery to have the moſt famous of the Ancients in this Art always in their eye; and to conſider that we not only enjoy all the Advantages they had, but far greater; for we have been ſo largely aſſiſted by the Inventions of ingenious Men in theſe latter days, that if we equal our Anceſtors in Induſtry, we ſhall eaſily exceed them in Skill.

But nevertheleſs extremely neceſſary.

LXXIV. But altho' the Attainment of Surgery had been ſtill more difficult than it is, yet as we do not enquire into the Difficulties, but the Honours and Uſes that attend the Acquiſition of an Art or Science, before we make choice of it; this is ſo far from being a Diſcouragement to generous Minds, that it is rather an Incitement to their Induſtry. That Surgery is extremely neceſſary for

[a] See Celsus, Book V. Chap. 26. Number 24.

the Preſervation of Life, does not only appear from what we have already laid down, but from the Neceſſity the Phyſicians frequently lye under of calling for the aſſiſtance of this Art, not only in external Diſorders (to which ſome would impertinently confine Surgery) but in internal Complaints alſo, where Medicines, and a proper Diet, are in no wiſe equal to the Cure, as is the Cataract, Stone in the Bladder, Empyema, Dropſy, Suppreſſion of Urine, difficult Births, and an infinite Number of other Caſes; in which they are often obliged to fly to Surgery, as their ſole Anchor; as appears from the Teſtimony of the great HIPPOCRATES [a]. Amongſt the great numbers that have been Scoffers and Deriders of Phyſic, there have been very few ſo hardy as to reject Surgery as an uſeleſs Art; for indeed he muſt be entirely given up to Impudence and Folly that would pretend this to be an uſeleſs Art, by whoſe Aſſiſtance the moſt grievous Diſorders that the Body is ſubject to are relieved; to wit, Wounds, and the Loſs of Blood that is conſequent upon them, Fractures or Luxations of the Bones, Stones in the Bladder, Suppreſſion of Urine, and an infinite Number of others.

Surgery the moſt certain part of Phyſic.

LXXV. I would have no one be ſurprized at the Aſſertion, that Surgery ſurpaſſes all other Branches of Phyſic in point of Certainty; what CELSUS ſaid formerly upon this Occaſion is very true [b], "The Effects of Surgery are more "evident than thoſe of any other Branch of Phyſic, ſince in many Diſeaſes, (the "internal eſpecially) Nature or Accident may do much, and the ſame Me- "dicines have ſometimes a good Effect, and ſometimes no Effect at all, ſo "that it becomes Matter of Doubt, whether Health be the Effect of the Me- "dicines that have been adminiſtred, or of a good natural Conſtitution of the "Body; but in Diſorders that are relieved by the Aſſiſtance of the Hand, it "is very evident from whence the good Effect proceeds." Whatever good Effects we produce by ſtopping violent Hæmorrhages, by taking off Tumors and Excreſcences, by curing Herniæ, by cutting for the Stone, by couching Cataracts, by drawing forth ſuppreſſed Urine, by changing the croſs Poſition of the Infant in the Womb, and bringing it into the World, by ſetting broken Bones, and reducing luxated ones, and by relieving other Diſorders of this Sort; for all this we are evidently obliged to the Hand of the ſkilful Surgeon.

Students in Surgery incited to Induſtry.

LXXVI. Having premiſed this by way of Introduction, we cannot avoid again and again exciting all Students of this moſt noble Art to Diligence and Induſtry, and not to reſt ſatisfied with being able to ſhave, ſpread a Plaſter, or open a Vein; for I would have them know, that not only a good natural Sagacity, but great Labour and Study alſo, are abſolutely required to qualify a Man for ſo great a Truſt as that of taking care of the Health of Mankind. Students in Surgery ſhould not only be furniſhed with Strength of Body, but Conſtancy of Mind alſo, that they may remain unmoleſted and unmoved by the Stench, Blood, Pus, and Naſtineſs that will naturally occur to them in their Practice. They ſhould conſider, that by frequent Exerciſe theſe Things will become cuſtomary to them, and they will acquire, as it were, a ſecond Nature. And a Surgeon ſhould ſubmit to the greateſt Inconveniencies, rather than neglect any thing that might be for the Benefit of his Patient; for then he will have performed his Duty properly, and have ſatisfied his own Conſcience, when he has done every thing that comes within the Compaſs of his Art for the Service of his Patient.

[a] Sect. 8. Aph. 6. [b] See Lib. VIII. Præfat. and HIPPOCRATES de Arte, V.

INSTITUTIONS OF SURGERY.

PART the FIRST.

Of the Five Kinds of Diſorders of the Body.

BOOK the FIRST.

Of WOUNDS.

CHAP. I.

Of Wounds *in general.*

I. WE were perſuaded by two Reaſons to begin theſe Inſtitutions of Surgery, with an Enquiry into the Nature of Wounds; for Wounds are not only more common than any other external Injuries, but the Nature of them alſo is more eaſily explained in our Schools of Surgery. And indeed when we are thoroughly acquainted with the Nature of a Wound, we ſhall with much greater Eaſe and Clearneſs comprehend all the other Doctrines of Surgery. What a *Wound* is, the moſt unſkilful are acquainted with; but it is frequently defined to be a *violent Solution of the Continuity of the ſoft external Parts of the Body, made by ſome Inſtruments, whether ſharp or obtuſe.* Others take a greater Latitude in defining it, *and call every external Hurt of the Body, by what Cauſe ſoever produced, a Wound.* For Inſtance, they reckon violent Strokes upon the Head, Thorax, or Abdomen, under the Title of Wounds, though no external Parts are divided, as will eaſily appear from what we ſhall ſay below, when we come to treat of mortal Wounds. A Wound, what.

II. On the other hand, ſome are of Opinion, that unleſs the injured Parts of the Body are divided by ſome ſharp Inſtrument, as by a Sword or Knife, it is by no means to be called a Wound; though it plainly appears, from what has been already ſaid, that thoſe Injuries which are produced by blunt Inſtruments, may properly enough be called Wounds; under this Head are Gun-ſhot Wounds, Wounds inflicted by Stones, Clubs, or that come by violent Falls: Therefore we may conſtitute two Differences of Wounds; the one made by *acute*, the other by *blunt Inſtruments.* Differences of Wounds in relation to the inflicting Inſtrument.

On what Parts of the Body Wounds are inflicted.

III. Wounds are generally inflicted upon the *ſofter Parts of the Human Body*, ſuch as the Skin, Fat, Muſcular Fleſh, Ligaments, Blood-veſſels, and Nerves, and Parts that are compoſed of theſe, as the Viſcera and Inteſtines; but whilſt we are aſſerting this, we muſt by no means entirely exclude *the more ſolid Parts of the Body, as the Bones*; ſince the Bones themſelves afford frequent Examples of Injuries received from ſharp Inſtruments. The Parts, therefore, that are ſubject to theſe Injuries will afford us two Diſtinctions of Wounds; one, *Wounds of the ſoft Parts*; the other, *Wounds of the Bones.*

Cauſes of Wounds.

IV. As *Cauſes of Wounds*, all Inſtruments of what kind ſoever, whether blunt or ſharp, may properly be reckoned, provided they are of ſuch a Nature, that, upon the violent external Application of them, they are capable of producing a Solution of Continuity in the Parts of the Body upon which they are inflicted: For a Solution of the external Parts from an internal Cauſe is not called a Wound, but rather an *Abſceſs*, or *Ulcer*. So when the harder Parts of the Body, to wit, the Bones, are broken by a Fall, or by a violent Blow received from a blunt Inſtrument, we do not call that a Wound, but a *Fracture*.

Effects of Wounds.

V. *The Effects which are produced by Wounds*, beſides the Diviſion of the ſofter Parts, are generally *Profuſions of Blood*, though they are ſometimes attended with much greater Miſchiefs than theſe: For it can ſcarcely happen, but that the divided Parts muſt in ſome meaſure, if not totally, loſe their natural Functions, according to the different Uſes for which the Part is intended, and according to the different Degree of Injury that it receives. The greater Number of Uſes a Part is intended for by Nature, the worſe will be the Conſequence of a Wound upon that Part. This Principle is ſo extenſive, that we are always guided by it in forming our Prognoſtic, whether the Wound will prove mortal or not. He therefore that is beſt ſkilled in Anatomy, that is beſt inſtructed in the Situation of Parts, and their Uſes, will be enabled to form the moſt accurate Judgment of the Conſequences that will neceſſarily attend a Wound upon any particular Part.

Different ſorts of Wounds.

VI. What we have taught of the different Situations and Cauſes of Wounds, ſufficiently demonſtrates, that there are many different kinds of Wounds: ſome are brought on by *Puncture*, ſome by a *Stab*, and ſome again by a *Blow:* ſome are *curable*, others *incurable:* ſome are made with *ſharp Inſtruments*, others with *blunt* ones: To which Claſs may be referred all Gun-ſhot Wounds, all that are occaſioned by a Blow, or a Fall, and which the Surgeons diſtinguiſh by the Name of Contuſions. With regard to their *Figure*, ſome form a *right Line*, others are *curve*, *tranſverſe*, or *oblique:* with reſpect to their *Situation*, ſome are ſeated in the *Head*, others in the *Neck*, *Thorax*, or *Abdomen*; and of theſe, ſome are *external*, others *internal.* Variety of different kinds of Wounds ariſe from the great diverſity of Condition that Wounds are left in: For in ſome Wounds the inflicting Inſtrument, or Part of it, remains; for inſtance, a Leaden Bullet, a Piece of Glaſs, or of a Grenade, the Points of Swords or Arrows: But in ſome Wounds nothing of this kind is left. Sometimes *Fractures of the Bones* accompany Wounds, which we almoſt always find to be the Caſe in Wounds of the Head, and in Gun-ſhot Wounds. Some Wounds alſo are attended with Poiſon, as thoſe which are made with poiſoned Arrows, or other Inſtruments. Under this Head we may very properly rank the Bites of Animals, but more particularly of mad or venomous Animals. Some are of Opinion, that

that Wounds which are made with Copper or Silver Inſtruments ſhould be reckoned in this Claſs, the Poiſon of which, if there is any, is owing to the Vitriol that is mixed with theſe Metals.

VII. In *ſlight Wounds*, that is to ſay, where no conſiderable Vein, Artery, Nerve or Tendon is concerned, you will uſually remark the following *Appearances:* At firſt ſight, the Wound appears to us as a red Line drawn upon the Part, but upon being dilated the Blood inſtantly guſhes out, in greater or ſmaller Quantities, in Proportion to the Size and Number of the Blood-veſſels that are injured. The Hæmorrhage, after a ſhort Continuance, ſtops of its own accord, or by ſome external Application, and the Blood concreting in the Wound, forms a Cruſt: The Lips of the Wound now begin to look red, and ſwell, and are attended with ſome Degree of Pain and Inflammation. If it is a large Wound, a Fever, that is to ſay, an univerſal Heat and Quickneſs of Pulſe almoſt always enſues. Upon the third or fourth Day, ſooner or later, a whitiſh glutinous Humour, not unlike white Oil, appears; and this is known to the Surgeons by the Name of *Pus*, or *Matter*. Upon the Appearance of Matter, the Redneſs, Tumor, Pain, Inflammation, and Fever diſappear entirely, or at leaſt are ſenſibly abated; and theſe are the Signs of a Wound inclining to heal: For under the Matter we have deſcribed, new Fleſh ſprings up from the wounded Veſſels, which having by Degrees filled the Wounds, dries upon its upper Part, and forms a Cicatrix. What appears after a ſlight Wound.

VIII. In *dangerous Wounds*, that is, where any conſiderable Blood-veſſel is wounded or divided, there generally enſues ſo violent an *Hæmorrhage*, that the wounded Perſon is an inſtant ſenſible of great loſs of Spirits, and Weakneſs, and faints away; and when the larger Arteries are wounded, whether they are internal or external, he dies upon the Spot. Although ſomewhat leſs Danger is apprehended from Wounds that are inflicted upon the Veſſels, which are ſituated upon the external Parts of the Body (ſome few excepted) becauſe they will admit of the Ligature, and other Means for reſtraining the Violence of the Hæmorrhage: Nevertheleſs it is almoſt impoſſible to prevent the Limbs which lie below the Diviſion of the Artery, and are uſed to receive their Nouriſhment by that Channel, from becoming paralytic; nay, ſometimes, from mortifying. This is almoſt conſtantly the Caſe when the Trunk of the Brachial or Crural Artery is divided. What after dangerous Wounds.

IX. The Conſequences we have juſt related, follow upon the total Diviſion of a conſiderable Vein or Artery: It remains now that we conſider what will follow upon a partial Diviſion of them. Whenever a large Artery is wounded, and not entirely divided, the wounded Fibres inſtantly contract themſelves; by this Means they dilate the Orifice of the Wound, and render it difficult to ſtop the Flux of Blood; and though the Hæmorrhage be ſtopped for a little Time, yet it will burſt out again on a ſudden violently, or at leaſt produce a dangerous Tumor, called an *Aneuriſm*. This will frequently be the Caſe, when only the external Coat of the Artery is wounded: For by this Means the internal Coat of the Artery is left to ſuſtain the whole *Impetus* of the Pulſe, which being unequal to, it is forced by Degrees into a Tumor like a Bag, whence frequently enſue the moſt calamitous Conſequences. But of this Caſe we ſhall treat more fully in another Part of this Work. What follows the partial Diviſion of a Blood-veſſel.

Consequences following from a wounded Nerve.

X. Upon *the Division of a Nerve*, the Limb to which that Nerve was extended becomes instantly rigid, void of Sensation, and withers; so it is no wonder that a Man instantly expires upon the Division of those Nerves that are sent to the Heart, or *Diaphragm*. A Wound also is attended with great Danger, where the Nerve is only partially wounded, and not entirely divided; for the wounded Fibres contract themselves, and those that remain undivided suffer too great Extension, which will bring on most violent Pain, Spasms, Convulsions, Inflammations and Gangrenes, and sometimes Death itself.

Consequences of a wounded Tendon.

XI. When *a Tendon is wounded or divided*, the Part to which it belongs loses its Motion; but if it is divided only in Part, it will produce much the same Symptoms with a Nerve in the same Circumstances. The consequence of Wounds upon the internal Parts, you will find more fully explained when we come to treat of the *Diagnosis* and *Prognosis* of Wounds.

Of the *Diagnosis* of Wounds in general.

XII. The *Diagnosis* of Wounds is for the most Part extremely easy, for the Size, Situation, and Nature of the Wound, generally lies open to the Sight. Nevertheless there are some Cases that are not very uncommon, where it is somewhat difficult to discover the true Nature of the Wound. But in order to make the more easy Discovery, whether the Wound is deep or superficial, whether any of the internal Parts are wounded or not, the Surgeon should always be careful upon the first Visit to clean the wounded Part with a Sponge squeezed out of warm Wine or Water, that he may have a clear View of the Bottom of the Wound. But whenever the Flux of Blood from the Wound is very violent, it must be instantly dressed up, and the cleaning of it in this Manner deferred, till it is in a quieter Disposition.

What internal Parts are wounded may be discovered, 1. By Anatomy. 2. By the Posture of the wounded Person.

XIII. In deep Wounds we are to examine, whether the fat and fleshy Parts are the sole Objects of the Wound, or whether some considerable Blood-vessels, or other internal Parts, are not Partakers of the Injury. We are assisted in this Examination by several Means. Our first Assistance we receive from the Knowledge of *Anatomy*, since by that Science we are taught the Situation of each particular Artery, Nerve, Tendon, Viscus, and Intestine. The *Posture of the wounded Person* at the Time he received the Injury is also to be diligently considered, whether he was standing upright, or lying down, and to which Side he inclined; by this Means we may with some Certainty judge what Parts were Sufferers by the Wound, and how far the Weapon penetrated. We are also to consider of *the Posture, Manner, and Force used by the wounding Person*; for the greater degree of Force there was in dealing the Blow, so much the larger and deeper will the Wound be. Nor should we neglect here to enquire after *the Shape of the Weapon* by which the Wound was inflicted, since by considering its Size, and observing the Quantity of Blood that adheres to it, we may in some Measure judge of the Depth of the Wound.

3 By the Posture and degree of Force used by the wounding Person. 4. By viewing the Weapon.

5. By the Disturbance given to Actions of particular Parts.

XIV. In a word, there is nothing will give you truer Light into the Nature and Consequence of a deep Wound, than a due Consideration of what natural Actions of the Body are impeded or disturbed thereby. For instance, in Wounds of the Breast, when the Patient draws his Breath with Shortness and Difficulty, and is at the same time attended with an Hæmoptysis and Hiccoughs, we may fairly conjecture that the *Lungs* or *Diaphragm* are wounded; though the Hiccoughs often arise too from Wounds in the Stomach, in the Bladder, and other internal Parts of the Body: So in Wounds of the Abdomen, when Chyle is voided,

voided, it is a plain Indication that the *Stomach*, the *ſmall Inteſtines*, or the *Lacteal Veſſels* are wounded. When Excrements paſs by the Wound, the *large Inteſtines* are wounded. In the ſame manner, an Effuſion of Bile ſhews the *Liver* or *Gall-Bladder* to be divided. If Urine paſſes by the Wound, the *Bladder*, or *Ureters* are injured: but bloody Urine denotes a Blow on the *Kidnies*, or a Wound of the *Bladder*; but when the Diſcharges of Blood this Way are violent, it is a ſtrong Indication that ſome of the larger Blood-veſſels muſt be wounded. Vomiting of Blood, for the moſt part, declares the *Stomach* to be the injured Organ; *violent Pains*, attended with *convulſive Twitches*, ſhew that a Nerve is wounded, or that ſome foreign Subſtance is left in the Wound. Whenever the Senſes are diſordered after a Wound received upon the Head, a Concuſſion of the Brain is much to be feared.

Of the *Prognoſis* of Wounds.

XV. What we have laid down concerning the general Method of forming the *Diagnoſis* on Wounds, will alſo ſerve us in forming their *Prognoſis*, or Judgment of the Conſequences that will attend them: For after a due Conſideration of the Nature of a Wound, and the Symptoms attending it, it will be no very difficult matter, to determine whether it be attended with great danger or not, whether the Cure will be difficult or eaſy, whether it will be a perfect or imperfect Cure. We may remark in general, that ſlight Wounds admit of an eaſier Cure than deep ones: Young Patients, or thoſe of a ſound Conſtitution, are eaſier cured than the old or diſeaſed, particularly than Hydropical, Conſumptive, Scorbutical, or Pocky Perſons. The cure is eaſier performed in *a temperate Air*, than in a cold or hot Climate. There are alſo greater hopes of Succeſs where there are no violent Symptoms attending, as profuſe Hæmorrhages, large Tumors, vehement Pains, Convulſions, Inflammation, Fever. But HIPPOCRATES has very rightly remarked [a], "Where a large Wound is made, it is a very bad ſign "if no Tumor ſucceeds." This CELSUS has explained in a much more elegant manner [b]: "It is of bad conſequence for a Wound to be attended with a large "Tumor, but it is of the laſt conſequence if it is attended with no Degree at "all of Tumor; the firſt is an Indication of great Inflammation, the laſt of "Mortification." Some Degree of Tumor therefore is beſt.

Whether Wounds are curable or incurable.

XVI. We come now to enquire what *Wounds admit of Cure*, and what are *incurable* or *mortal*. The Knowledge of this Point is no leſs uſeful and neceſſary to the Phyſician and Surgeon, than it is difficult to attain: And more eſpecially as the Law inflicts a very heavy Puniſhment upon Murderers, it is of very great Conſequence to be able to diſtinguiſh what Wounds are of themſelves mortal, and what only become ſo by Accident or Neglect; that the Guilty may receive their juſt Sentence, and the Innocent be freed: On which Account the moſt eminent Phyſicians and Surgeons are often called in, and, with great Reaſon, by the Adminiſtrators of Juſtice, in all Caſes of Difficulty or Uncertainty. In order to enable the Surgeon to anſwer Queſtions upon this Head with greater Readineſs and Certainty, we ſhall be very particular in this Article. Therefore in this View we ſhall divide Wounds into three Sorts. Some Wounds, 1. Are abſolutely of themſelves mortal: others, 2. Are in their own Nature mortal, if not relieved by timely Aſſiſtance: others, laſtly, 3. Become mortal by Accident or imprudent Treatment, though they were otherwiſe curable.

[a] HIPP. Aphoriſm, 66. Sect. V. [b] Book V. Chap. 29.

XVII. We

1. Mortal Wounds. 1. Where there is an Hæmorrhage not to be ſtopped by Art.

XVII. We properly ſtyle thoſe *Wounds mortal, which are not to be remedied by all the Art and Induſtry of Man.* So thoſe Wounds are juſtly deemed mortal that are attended with ſo violent an Hæmorrhage as to produce inſtant Death. In this Claſs are reckoned Wounds that penetrate the Cavities of the Heart, and all thoſe Wounds of the *Viſcera* where the larger Blood-veſſels are opened. Such are large Wounds of the Lungs, Liver, Spleen, Kidnies, Stomach, Inteſtines, Meſentery, Pancreas, Uterus, Aorta; of the Iliac, Cœliac, Renal, Meſenteric, Carotid, and Crural Arteries, (eſpecially if they are wounded near their Origin) of the Subclavian alſo or vertebral, of the Vena Cava, the Iliac Vein, internal Jugular, Vertebral, Renal, Meſenteric, of the Vena Porta, and of other large Veins that lie deep in the Body, becauſe their Situation will not admit of proper Applications to reſtrain the Flux of Blood. I think therefore I may very juſtly reckon theſe amongſt the Wounds that are abſolutely incurable, ſince they are not remediable either by Aſtringents, Ligature, or Fire. We may refer alſo to the ſame Claſs the Wounds of the Brachial Artery, if near its Origin; for the large Effuſion of Blood generally deſtroys the Patient before Aſſiſtance can be procured; more eſpecially if the Artery and Vein are both wounded together.

2. Where the Communication is cut off between the Head and the Body.

XVIII. Thoſe Wounds are no leſs mortal than the former, *which obſtruct or entirely cut off the Paſſage of the Animal Spirits to the Heart.* Such are Wounds of the Cerebellum, Medulla Oblongata, and all violent Strokes of the Brain itſelf. There is Reaſon to apprehend very great Danger, when the ſmall Veins or Arteries which are contained in the Cranium are injured; for the Blood flowing from them into the internal Sinuſes of the Brain, either produces too great a Preſſure upon thoſe very tender Parts of the Brain, and ſo obſtructs the Courſe of the Blood and Spirits; or being corrupted, putrefies the Brain, if it cannot be evacuated by the Aſſiſtance of the Trepan, which is the Caſe when this Accident happens at the lower Part of the Cranium, or in the Sinuſes of the Brain. Nor is there leſs Danger, where *the Nerves which tend to the Heart*, or the *Cerebellum*, are wounded, or entirely divided; for after this, it is impoſſible for the Heart to continue its Motion.

3. Where the Power of Breathing is taken away.

XIX. To this Claſs alſo are to be referred *all Wounds that entirely deprive the Animal of the Faculty of Breathing.* Therefore there is great Danger where the *Aſpera Arteria* is completely divided; for where it is only divided in part, it may be healed again by the Aſſiſtance of an expert Surgeon. I have many [a] Hiſtories of Cures of this Kind, both by myſelf and others. To this Place alſo belong violent Shocks of the *Bronchia*, (as the *Par Vagum*, or *Intercoſtals*) *Mediaſtinum*, and Diaphragm, eſpecially the tendinous Part of it.

4. Where the Courſe of the Chyle is interrupted.

XX. Thoſe Wounds, alſo, *which interrupt the Courſe of the Chyle to the Heart*, are no leſs incurable than the former: Such are the Wounds of the Stomach, Inteſtines, Receptacle of the Chyle, Thoracic Duct, and larger Lacteals: to which we may add Wounds of the Œſophagus, if they are large; though Death is not ſo ſudden an Attendant upon theſe Wounds, but for Want of Nouriſhment they are greatly weakened by Degrees, and die conſumptive.

[a] See BOHNUS *de Vuln. renunc.* Pag. 21. though he reckons theſe among incurable Wounds.

XXI. In

XXI. In this Place we must by no Means omit to speak of *Wounds which are inflicted upon the interior membranous Parts that contain some secreted Fluid*, as on the Bladders, either for the Bile or Urine, the Ureters, Stomach, Intestines, Receptacle of Chyle, and Lacteal Vessels. The Fluids contained in these Parts, when once they are let loose into the Cavity of the Abdomen, cannot be properly discharged, and therefore easily corrode the internal Parts of the Body; and the Membranes that contained them are generally so fine, that they will not admit of Agglutination, especially since no Medicine from without can be applied: A few, indeed, have recovered after slight Wounds in these Parts, but since that Number is but few, and the Cure was accidental, and not performed by the Surgeon's Art, I think I am sufficiently justified in adding these to the Number of incurable Wounds.

5. Where the abdominal Fluids which are contained in Membrances are extravasated.

XXII. We have hitherto been treating of Wounds that were curable by no Art or Industry; we proceed now in order to describe those *which prove fatal, if neglected and left to Nature.* By these we mean those Wounds that produce instant Death, unless relieved by present Assistance, but are curable by a good Surgeon called in time; such are Wounds of the larger external Blood-vessels, which might be remedied by Ligature, by the Application of astringent Medicines, or of the actual Cautery. Of this kind are Wounds of the Brachial or Crural Artery, unless they are too near the Trunk of the Body. Wounds in the large Arteries of the Cubit or Tibia, of the Branches of the external carotid and temporal Artery, are of this kind; to these may be added Wounds of the Jugular, and other Veins situated upon the external Parts of the Body; but in these Cases we always suppose that Help is called for before there has been a vast Profusion of Blood.

II. Wounds proving mortal, if left to themselves.

XXIII. *Wounds are properly said to become mortal by Accident, where the Patient's Death is occasioned either by the ill Conduct of the Patient himself, or by the Ignorance or Neglect of his Surgeon, the Wound itself being deemed curable.* Under this Head are to be reckoned, 1. *Those Wounds which the Surgeon has neglected to cleanse sufficiently, though he had it in his Power to do it*; as when some foreign Body, which might easily have been extracted, is left in the Wound by the Carelessness of the Surgeon, and produces Inflammations, Hæmorrhages, Convulsions, and at last Death itself. So in Wounds of the Thorax and Abdomen, if the Surgeon does not use his utmost Diligence to evacuate the grumous Blood, it will corrupt there, and by drawing the neighbouring Parts into consent, will expose the Patient to instant Death[a]. Therefore great Care must be taken that

III. What Wounds become mortal by Accident.

[a] There are some Cases where the Surgeon finds all his Attempts to evacuate the Blood fruitless, and there he is in no wise to be blamed, but the Wound is to be looked upon as mortal. Take the following Case by way of Example: In the Year 1725, a Man received a Wound by a Sword: the Sword entered about half an Inch below the right Pap, between the fifth and sixth Ribs, and passed downwards through the Diaphragm into the Cavity of the Abdomen. Now although a considerable Quantity of Blood was discharged by the Wound for the three first Days, yet it was impossible that the Blood which was extravasated in the Cavity of the Abdomen, should be discharged by the Wound at the Breast, the Patient therefore died on the eighth Day. His Body being opened, we found a large Quantity of grumous Blood under the Liver, which adhered so strictly to its concave Part, that we found it difficult to separate them with our Fingers. Upon clearing away the Blood, we perceived a Wound through the Body of the Liver, about half an Inch wide, and a Wound answering to that in the muscular Part of the Diaphragm. There were two or three Ounces of Blood found in the lower Part of the Abdomen, but none in the Cavity of the Thorax. From

the Lips of the Wound do not close, till the Blood which is collected in the Cavity of the Body be all evacuated, if possible, which you will easily perceive by the difficulty of Breathing, and other bad Symptoms being removed [b]. But if any of the larger internal Vessels are wounded, then all Attempts to discharge the Blood are vain; for the violence of the Hæmorrhage takes off the Patient. 2. *Wounds also are reckoned mortal by Accident, which are treated or searched in too rough a manner by the Surgeon*; for if you handle Wounds roughly, that are full of nervous Parts or large Blood-vessels, there is great Danger of bringing on Hæmorrhages, Convulsion, Inflammation, Gangrene, and Death itself. The Case is also the same, 3. *In external Wounds which are slight of themselves, but the Patient is lost by the Violence of the Inflammation, which is brought on, and increased by the Surgeon's injudicious Treatment.* Or, 4. *When any one is taken off by the Violence of the Hæmorrhage from a Wound of the Hand or Foot*; for in this Case a Surgeon might easily have stopped the Blood by the Application of proper Remedies, or by the actual Cautery, or Ligature. Or, 5. *Where the Patient is guilty of any Intemperance in eating or drinking, of excess of any Passion, of exposing himself to the cold Air, or of using any violent Exercise.* For by this means Wounds, more especially those of the Head, by being liable to fresh Hæmorrhages, and other dangerous Accidents, frequently become mortal, notwithstanding the Surgeon uses his utmost Care and Skill. Under this Head also are to be reckoned, 6. *Those Wounds of the Head where the Patient is lost by the vast Quantity of Blood which is extravasated in the Cavity of the Cranium, and confined there; but where he might have been relieved if the Trepan had been used in time*; for though Wounds of this kind generally prove incurable, yet as there is a Possibility of saving a Person in these Circumstances by the use of the Trepan, this may properly be reckoned amongst the doubtful Cases, and not deemed absolutely mortal. Lastly, 7. *A bad Habit of Body frequently prevents the Cure of Wounds, which would admit of an easy Cure in an healthy Subject.* So you frequently see the slightest Puncture in the Hand or Foot of an Hydropical, Consumptive, or Scorbutical Person, shall produce a Gangrene, and prove mortal, though the Surgeon neglects no proper Application to prevent it. I know very well that some Physicians reckon all Wounds of this kind as absolutely mortal; but I think they are much better justified who pronounce a milder Sentence, and deem them of the doubtful Kind.

the Impossibility that appeared of discharging the extravasated Blood, and the Largeness of the Wounds of the Vessels, I pronounced this Wound mortal: but, to my great Surprize, some Physicians declared it so only *per accidens*, for which reason the Murderer was acquitted. Whose Opinion was most justifiable, I leave to others to determine. See *Fr. Hoffman. Consult.* Tom. I. p. 376. *& seq.*

[b] The Surgeon is not to be blamed if he is sometimes deceived in this Point; of which I will here give you a notable Instance. In the Year 1726, a Man at *Helmstadt* was wounded in such a Manner under the right Pap, that the Blood did not only flow in great Quantities from the Wound, but discharged itself also by the Mouth: but in two Days time the discharge of Blood, both at the Wound and by the Mouth, through the Application of proper Medicines, entirely ceased, and the Patient found himself in so good Order, that he expected in a very short time to get abroad: He breathed so freely, that he easily prevailed upon me to remove the Tent that I had put in to keep the Wound open. But behold the Consequence! after remaining in this Manner entirely easy for two Days; on the third he died suddenly. Upon opening the Thorax, we found at least a Pound of concreted Blood, which could by no Means have been discharged, since there

XXIV. We have laid down these Principles to guide Physicians in giving their Opinions in Courts of Justice, concerning the necessary Consequences and Fate of Wounds. Although all Wounds should be examined upon these Occasions with great Circumspection, yet none require more careful looking into than Wounds of that Class which are described under *N.* XXII, because there are great Dissensions amongst the Learned upon this Head. Some are of Opinion, that the Wounds mentioned at *N.* XXII, are to be referred to the third Class, and so are to be reckoned mortal only by Accident, and by this Means they frequently acquit a Murderer. How they support this Opinion I cannot tell. For my own Part, whenever I have found a Man lose his Life by receiving a Wound in an Artery, at a Time of Night when a Surgeon could not be called, I have always determined that Wound to be mortal, and that the offending Party was guilty of the Murder. On the other hand, where a Wound of the same kind has been received in the Day-time, and the Patient has lost his Life by the neglect of the By-standers, in refusing to call proper Assistance, or by the Ignorance of the Surgeon; in these Circumstances I have always declared the Wound to have been mortal only *per accidens*, and have given my Opinion, that the accused Person ought to be acquitted, and the Surgeon indicted. But in order to form a proper Judgment in these Cases, it is necessary that we should be well informed of all the Circumstances [c].

It is difficult to form a Judgment concerning the Fate of Wounds.

XXV. In very doubtful Cases, to be sure the mildest Sentence ought to take Place, according to the old saying, *It is better to let ten guilty Persons escape, than to punish one innocent Man:* For to be too rigid in these Cases, will not only burden the Conscience of the Judge, but be also injurious to the Public.

What is to be done in doubtful Cases.

XXVI. For the use of the younger Surgeons, I shall here subjoin the Form which I always use in giving my Opinion into Court, concerning the Nature of a Wound.

The Form of delivering in a Surgeon's Opinion.

appeared no Symptoms which could give room to suspect that there remained any extravasated Blood concealed. Besides, BELLOST, DE LA MOTTE, and several other celebrated Surgeons amongst the Moderns, absolutely forbid keeping Wounds of the Breast open by the use of Tents, though I doubt much whether this Advice is always to be followed. But I leave this to the Determination of others.

[c] As an Example of this, take the following Relation. In the Year 1733, a Woman living in the Suburbs near *Brunswic*, walking out in the Evening just before the Gates of the City were shut, received a Blow on the Head from a Man with a large Club, which laid her flat upon the Ground, and left her quite senseless; when the Fellow saw this, he took to his Heels, and nobody was left near her, but her Husband and three small Children; the Man, frighted out of his Wits, ran about to see if he could get People to assist him to carry his Wife home (for she was a very large Woman) but the Night coming on he could prevail with no one, and the City Gates being shut, it was impossible to bring a Surgeon to her: the Woman therefore was left upon the Ground all Night, without any Assistance, and died the next Morning. When the Physicians and Surgeons came to examine her, they found a Fissure in the Cranium, and, upon raising the Scalp, they found a large Quantity of extravasated Blood under the *Dura Mater*, lying upon the right Lobe of the Brain, and therefore very judiciously determined it to be a mortal Wound. The Advocate for the Criminal opposed this Verdict, because there was no Surgeon called to treat her in a proper Manner, by which she might possibly have been saved; upon this Difference of Opinions I was called upon to determine this Matter. I declared as my Opinion, that if the Woman had been within the City, where she might have had the Assistance of Physicians and Surgeons, and had lost her Life through their Neglect or Ignorance, then the Wound ought to have been deemed mortal *per accidens*; but in the present Case, it was impossible she should have had any such Assistance, therefore her Death was occasioned by the Blow she received, and the Wound ought to be judged mortal *per se*.

" I the underwritten, having this Day diligently examined the dead Body of " A. B. in the Preſence of C. D. E. *&c.* found it to have received the follow- " ing Wounds: that is to ſay, in the back Part of the Body, under the right " Shoulder, I diſcovered a Wound of the width of one Inch, through which I " could paſs my Finger with great eaſe, between the Ribs, into the Cavity of " the Body. Upon opening the Breaſt, almoſt the whole right Side was found " full of coagulated Blood, upon removing which, I found a Wound alſo pene- " trating into the right Lobe of the Lungs, which not only pierced through " this Lobe, but alſo divided ſome of the larger Branches of the pulmonary " Veſſels, with the *Bronchiæ* themſelves. The Heart and all its Veſſel were " entirely empty: no Miſchief appeared either in the Head or Abdomen. The " Effuſion of Blood, which was occaſioned by dividing the Veſſels in the Lungs, " could not but bring on inſtant Death: Therefore I hereby declare this Wound " to have been the Occaſion of his Death. In teſtimony of the Truth whereof " I have hereto ſet my Hand."

N. N.

Done at the Day of
in the Year of our Lord

Some general things with Reſpect to theſe Forms.

XXVII. Forms without Number may be made from this, by varying the Circumſtances. But above all I would adviſe the young Surgeon to be very careful in examining the State not only of the wounded Parts, but alſo of the Contents of the Cranium, Thorax, and Abdomen, that he may obſerve whether any thing preternatural has happened in either of thoſe Cavities. If any one is deſirous of being more thoroughly inſtructed in the Method of examining the Bodies of murdered Perſons, and in the proper Forms of making a Report, let him conſult a *French* Treatiſe upon this Subject, entituled, *L'Art de faire Rapport en Chirurgie.*

The CURE *of* WOUNDS.

Cure of Wounds.

XXVIII. Since a Wound is a Solution of the Continuity of the Parts of the Body, the Reunion of thoſe Parts ſeems to be the principal Intention. But ſince Wounds are of very different Kinds, ſome ſlight, and others of great Conſequence, in Proportion to this Difference ſo will the Manner of proſecuting this Intention differ.

Cure of ſlight Wounds.

XXIX. The Cure of ſlight Wounds is generally performed with great Eaſe, by applying a ſmall Portion of Lint to the Part, well ſaturated *cum Spiritu Vini*, *Oleo Ovorum*, *Terebinthinæ*, *Hyperici*, *Linimento Arcæi*, *Balſamo Copaibæ*, *de Mechâ*, *Peruviano*, *&c.* ſecuring the Dreſſings with a[a] Plaſter to keep the Wound clean. The Dreſſings ſhould be renewed once in a Day or two, and the Lips of the Wound will preſently agglutinate: Therefore, in Caſes of this Kind, a Surgeon is very rarely applied to.

Dangerous Wounds how to be treated.

XXX. Wounds which are attended with ſome Danger, where the Subſtance of the Part wounded is not impaired, are to be treated as follows. If there be too copious a Diſcharge of Blood, the Hæmorrhage muſt be ſtopped at the firſt Dreſſing: If not, the Wound in the firſt Place is to be cleanſed from all extravaſated Blood, Sordes, *&c.* In the next Place, if a Bullet,

[a] The Plaſters I chiefly uſe are *Empl. Diachyl. S. Diapalm.* or *Stypticum Crollii.*

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the Point of a Sword, any Part of the Clothing, a Piece of Glaſs, Splinter, or any other foreign Body, ſhall remain in the Wound, it is to be removed with the Fingers, or with proper Inſtruments, as ſhall be explained more fully below. Then the divided Parts are to be brought as near each other as poſſible, and their Situation is to be ſo maintained, by proper Bandages, that the Cicatrix which is left may appear even.

I. Method uſed in cleanſing Wounds.

XXXI. Foreign Bodies are removed from Wounds either by the Surgeon's Fingers, or by ſuch Inſtruments as we have deſcribed at *Plate* III, *Fig.* 3, 4, 5, 6, 7, 8, having firſt enlarged the Orifice of the Wound, if there be Occaſion. But where there are no extraneous Bodies to be removed, and the Hæmorrhage is not large, the grumous Blood is to be wiped away with a ſoft Sponge, or ſome fine Lint, wrung out of hot Wine or Brandy: having done this, you muſt proceed to dreſs, and laſtly to agglutinate the Lips of the Wound.

Method of extracting foreign Bodies.

XXXII. Before a Surgeon attempts the removal of extraneous Bodies from a Wound, it behoves him well to examine whether this is to be done inſtantly, or whether it is not beſt to wait for a more convenient Time. For if the Patient is become extremely faint, from the Loſs of Blood which he has already ſuſtained, it will be neceſſary here to ſtop the Hæmorrhage, and to endeavour in ſome Meaſure to revive him with moderate Draughts of warm Broths, White Wine Whey, or of ſome cordial Medicine: For if ſome ſuch Precautions are not taken, the Patient may not unlikely die in the Operation. So, where you have Reaſon to apprehend, that, in extracting the broken Point of a Sword or Spear, you are in Danger of wounding a large Blood-veſſel or Nerve, it is better to wait a little till the Patient comes to himſelf, or till the Wound is ſomewhat enlarged by the Suppuration of the Parts. All theſe Circumſtances will be well weighed by the prudent Surgeon.

What Inſtruments are uſed in extracting Bodies from Wounds.

XXXIII. Foreign Bodies, as the Points of Swords, Spears, *&c.* ſhould always be extracted from Wounds by the Hand if poſſible; and this ſhould be done with all the Expedition, Tenderneſs, and Care that may be, taking great care not to wound the neighbouring Parts; but if there are any Bodies that cannot be removed by the Hands, then you muſt have Recourſe to ſuch *Forceps* as we have deſcribed in *Plate* III, *Fig.* 3, 4, and 5. The ſame Aſſiſtances alſo we make uſe of in extracting Bullets, broken Pieces of Steel, Glaſs, *&c.* We ſhall ſpeak more clearly of the Method of extracting Bullets, when we come to treat of Gun-ſhot Wounds. Where the Wound is too narrow to admit of the Extraction of a foreign Body without lacerating the Parts, it muſt be dilated with the Knife, according to the Direction of the muſcular Fibres. The Extraction will admit of no Delay, but for Reaſons of great Moment, (*N.* XXXII.) beſides, whilſt the Wound is recent, and the Lips of it not ſwelled, it will ſuffer leſs Pain in handling; and the Patient, from a ſtrong Deſire of living, will at this Time endure more than afterwards, when he comes to reflect.

II. Of uniting dangerous Wounds.

XXXIV. The Wound being cleanſed from Blood, and all extraneous Bodies, and the Hæmorrhage ſtopped, it now becomes the Buſineſs of the Surgeon to cloſe the Lips of the Wound, and to conſider what is proper to be done to keep them in that Situation, that the Parts may ſpeedily unite. Different Methods are uſed in proſecuting this Intention, according as Wounds differ in their Conſequences, and in the Number and Degree of Symptoms attending them. For ſimple and ſlight Wounds require not the ſame Treatment as thoſe which

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are attended with dangerous Symptoms, or where the wounded Parts are torn and mangled. Again, Wounds, which penetrate into the Cavities of the Body, especially if any of the Viscera are injured, demand a different Method of Cure from those which are inflicted on the external Parts. And, lastly, another Distinction must be considered, whether the Wound was made by a Stab, or a Puncture.

Method of treating a Puncture.

XXXV. Amongst the Number of the most simple Wounds, we reckon those which are made by Puncture, or stabbing, upon the external Parts, and not penetrating deep. In these Wounds, after the Blood has been stopped at the first Dressing, by the Application of dry Lint, the common Digestive, or *Balsamum Arcæi*, or any of the vulnerary Medicines recommended in the Introduction, N°. XXXVII. is to be spread upon a Pledget, and applied once every Day; or if the Discharge is but small, every other Day, covering the Dressings with a Plaster and Compress, and securing the whole with a proper Bandage. At every Dressing you should be careful to remove every thing that will give way readily; the Pus, or Sanies is to be gently wiped off with fine Rags. It may be remarked in general, that too frequent Dressings do more Harm than Good, unless a more than ordinary Discharge of Matter, particularly in the Summer Time, or any other bad Symptom, require it: The Truth of this is attested by CÆSAR MAGATUS, in his Book, *De rarâ Vulnerum Deligatione*; by BELLOSTE, in his *Hospital Surgeon*, and others amongst the Moderns; not to mention my own Experience upon this Head. The first Dressings that are applied, especially where there has been a Flux of Blood, should by no means be removed forcibly, but be left till they fall off of themselves, which they will do when the Suppuration is formed: By this Means much Pain, and perhaps a fresh Hæmorrhage, may be avoided. But when a punctured or stabbed Wound penetrates very deep, the Cure is attended with many Difficulties, especially if a Nerve or Aponeurosis is lacerated, if the Wound is made perpendicularly down, and has no depending Orifice; for in this Case the Blood and Matter are easily collected at the Bottom, protract the Cure, and frequently form Fistulæ. To prevent these Consequences, it will be proper to press the Wound from the Bottom upwards; to apply a Compress towards the Fundus of the Wound externally, and to apply what is called the *expelling Bandage* over all, which presses much tighter upon the lower than the upper Parts.

A new Opening is frequently required.

XXXVI. But if all this Precaution should prove of no Effect, which is frequently the Case, it will be best to make a large Opening at the Bottom of the Wound before any Fistulæ are formed. In order to make this Opening to the greater Advantage, it will be proper to get a particular Sort of Probe or Needle, very blunt at Top, as at the Letter A; but at the other End provided with a large Eye or Hole through which a Linen Rag may be passed, (*See Plate* V, *Fig.* 1.) This Probe is to be passed to the Bottom of the Wound, and the blunt Part of it pressed outwards towards the Skin, till you can feel it with your Finger. When you have felt it, cut down upon it, if you can safely, and make a large Opening, spread the Rag that you have run through the Eye of this Probe with some vulnerary Balsam, and draw it through the Wound after the Manner of a Seton, especially in Gun-shot Wounds, and leave it there, dressing up both the Orifices with the same Balsam, covering the Dressings with Plasters and proper Bandages. In every succeeding Dressing, the Part of the

Rag

Rag that is left out of the Wound is to be ſpread with freſh Ointment, and the lower Part drawn down till this takes Place; and this Method is to be continued till the Wound is well cleanſed, the Diſcharge greatly diminiſhed, and all in a Readineſs to heal: The Seton is then to be removed, and the Wounds healed as uſual.

XXXVII. GARENGEOT deſcribes a triangular Inſtrument, invented by PETIT, for this Purpoſe, which the *French* call [a] *Trois quarts:* With this he makes an Opening at the Bottom of the Wound or Fiſtula, and introduces a Rag, which is paſſed through the Eye of this Inſtrument, and then through the Wound or Fiſtula, (*See Plate* IV, *Fig.* 1.) But as this Inſtrument is ſtrait, and I have frequently met with Caſes where that Form would not anſwer the Purpoſe, therefore I invented another, long before GARENGEOT's Book came out, for the Uſe of a Nobleman, who had a large Abſceſs in the fore Part of the *Abdomen*, which opened near the Navel on the right Side, but penetrated as far as the Groin on the ſame Side. The Situation of the crural Veſſels, in this Caſe, would by no Means admit of a new Opening, being made by a ſtrait Inſtrument. I invented therefore a crooked one, ſomewhat like the Inſtrument that is uſed to draw Water off in hydropical Caſes, but longer, becauſe the Fiſtula was of a great Length; (*See Table* IV, *Fig.* 2.) by the Aſſiſtance of which, whilſt I directed the Apex towards the Skin, I eaſily made a new Aperture, without endangering the crural Veſſels: And that I might at the ſame Time introduce the Seton, I contrived a Sulcus near the End, to which I faſtened a ſtrong Thread, and by drawing back the Inſtrument, I eaſily introduced the Seton through the Fiſtula. When the Seton was near all uſed, I ſewed new Cloth to the old, and ſo introduced it through the Wound, cutting off the foul Part, going on in this Manner till the Wound was ſufficiently cleanſed, and ſo preventing the Neceſſity of frequently introducing the Inſtrument. Another Method of doing it.

XXXVIII. It is to be remarked here, that although, in ſome Wounds, it is no Matter how ſoon you ſuffer the Opening to heal; in this caſe, on the other Hand, you muſt take great Care that the Orifices are not healed before the Bottom of the Wound. This may be done by the Aſſiſtance of a Cloth ſomewhat twiſted, by the *French* called *Bourdonet*, or a ſhort ſoft Tent. But when it is healed from the Bottom, you may remove the Tent, and heal the Orifices. How Wounds of this kind, which penetrate into the Cavity of the Thorax or Abdomen, are to be treated, will be taught below in the V^th and X^th Chapters. Cautions concerning Healing.

XXXIX. Wounds which are made by a cutting Inſtrument, where no Part of the Fleſh is taken off, and the Accident happens to the external Parts of the Body, and does not penetrate deep, after they are cleanſed ſhould be dreſſed with ſome [b] vulnerary Balſam, and the Lips of the Wound ſhould be cloſed and kept in that Situation: This is done after different Methods, according to the difference of the Wound. 1. This is to be obtained by *placing the wounded Part* Method of treating a Cut.

[a] *Traité des Inſtrumens*, Tom. I. pag. 391.

[b] Beſides the Medicines, which we have recommended above, at N°. XXIX, we may add here *Eſſentia Succini Terrebinthina, Maſtichis, Myrrha & Aloes, Gemmarum Populi*, &c. We muſt obſerve, too, that where a Contuſion is added to the Wound, which is the Caſe in Wounds made by Glaſs, Saws, &c. the mildeſt vulnerary Oils and Balſams are to be applied, as *Ung. Digeſtivum*, or *Balſam. Arcæi*; but in thoſe made by Knives, Swords, &c. the Eſſences and Balſams which we have juſt deſcribed are to be preferred, as being more aſtringent and drying.

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in a proper Poſture; as ſoon as the Wound is dreſſed, the Part ſhould be placed in ſuch a Situation, that the divided Parts may be moſt likely to be in conſtant Contact, repeating the Dreſſings once a Day, as we obſerved before, N°. XXXV, or at leaſt every other Day. 2. By *proper Bandage*; tying up the Parts ſo that the Lips may meet, and ſo eaſily unite. This is attended with the greateſt Succeſs in Wounds that are made lengthways, as in the Fore-head, Abdomen, Arms or Legs; for in this Caſe the *uniting Bandage at Plate* II, *Lett.* F. anſwers the End completely. 3. By *a proper Suture*, which differs according to the Difference of the Wound, but may be generally divided into the dry and bloody Suture. The *dry*, or, as ſome call it, the *baſtard Suture*, is the Application of ſticking Plaſters to keep the Lips of the Wound united: The *bloody*, or *true Suture*, is performing the ſame thing with a Needle and Thread.

What Wounds require a Suture.

XL. All Wounds are not to be united by the Needle; but thoſe only that are oblique, tranſverſe, or angular, and at the ſame Time very large and deep; or in Caſes where a Part is near cut off, as in the Noſe, Ear, Chin, Cheeks, *&c.* if a Wound is ſo circumſtanced, that it cannot be kept in a proper Situation by Plaſters and Bandages. 1. Wounds that are to be ſtitched ſhould be in their recent State, and properly cleanſed from extravaſated Blood, and all extraneous Bodies. 2. There ſhould be no Loſs of Subſtance, except in thoſe fleſhy Parts that are eaſily elongated, as the Lips. 3. There ſhould be no Inflammation or Contuſion. In theſe Caſes the Lips of the Wound are cloſed more elegantly and more ſucceſsfully by Suture. On the contrary, Wounds of long ſtanding, rancid or foul, attended with Venom, or that have their Seat in the Breaſt; or, laſtly, where the larger Arteries, Veins, or Nerves are injured, cannot be ſewed up without imminent Danger.

When, and in what Manner, the dry Suture is to be performed.

XLI. The dry Suture is to be uſed in ſlight Wounds, and eſpecially when they happen in the Face, and indeed wherever you think it is of Force enough[a] to keep the Lips together: As it gives no freſh Pain, and occaſions no Scar; it is much fitter for Wounds of the Face than the Needle, eſpecially as the Needle, beſide the Pain and Scars it occaſions, often produces no ſmall Inflammation. The Plaſters which are to form the dry Suture ſhould be of a ſufficient Length, and ſhaped like the Part to which they are to be applied, ſo as to ſurround the greateſt Part of it; but not the whole, leſt they ſhould retard the Circulation of the Blood, and bring on Tumors and Miſchiefs of that kind. They muſt alſo ſtick very faſt: which Purpoſe is excellently well anſwered by the *Emplaſtrum* ANDREÆ A CRUCE, *vel Stypticum* CROLLII, *vel Diachylum*, *vel Diapalmæ*, *Terebinthinâ probe ſubactum.* The Hæmorrhage being ſtopped, and the Wound well cleanſed, ſome tenacious vulnerary Balſam, ſuch as *Eſſentia Maſtichis*, *Succini*, *Balſami Peruviani*; or the *Balſamum Præfecti Equitum Melitenſium*, which you will find deſcribed in LEMERII *Pharmacopœia Univerſalis*, under the Title of *Balſamum Equitis Sancti Victoris.* Theſe, and indeed all Balſams of the gummy Kind, beſt anſwer the Intention in this Place, for they preſently form a ſticky balſamic Cruſt, which denies all Entrance to the Air, and preſently brings on the deſired Union; but over this a ſticking Plaſter is to be laid, adapted to the Size of the Part; you may apply two or more, according as

[a] Where the Finger has been cut almoſt off, ſo as to hang by a Piece of Skin, and the Surgeons have adviſed it to be taken off, I have cured it by this Suture frequently, and the Bones have united.

you

you ſee Occaſion, leaving a Space between. The manner of applying them you will ſee at *Plate* IV, *Fig.* 3, 4, 5. they are to be ſecured in their Situation by the Application of proper Boulſters and Bandages.

Other Methods of making the dry Suture.

XLII. According to PETIT's Method, the ſticking Plaſters ſhould have one, two, or more Openings in the Middle, *See Plate* II, *Fig.* 11. or in the Manner of thoſe at *Plate* IV, *Fig.* 7. that you may diſcover through theſe, as by the Spaces left between, in the former Method, whether the Lips of the Wound were properly united or not: And that you may alſo be able to apply proper Remedies to the Part, without removing the Plaſters. Theſe Plaſters are applied in the ſame Manner as the former, and left on till the Work is completed. But the dry Suture may be formed alſo after another Manner; to wit, make two Plaſters after the Preſcription of ANDREAS A CRUCE, ſpread upon ſtrong Cloth, anſwering in Size to the Wound; to the Sides or Margin of theſe faſten three or four Tape-ſtrings, according to the Length of the Wound: And then, after warming the Plaſters, apply them on each Side of the Wound, about the Diſtance of a Finger's Breadth from it, after the Manner deſcribed at *Plate* IV, *Fig.* 8. After this bring the Lips of the Wound together, dreſs it up in the Manner we have deſcribed above, and whilſt an Aſſiſtant keeps the Lips of the Wound in their proper Situation, let the Surgeon tie the Ends of the Tapes, firſt in a ſingle Knot, and then in a ſlip Knot, to keep the Parts in Contact. Over each ſhould be laid an oblong Compreſs, and over all of them a large ſquare one, the whole to be bound up with a proper Bandage. On the next Day the Wound is to be examined, and if the Tapes are looſened they muſt be drawn tighter again; but if they are not looſened, let them remain untouched, only moiſten the Parts with a few drops of Balſam, covering them up again with the Compreſſes and Bandage as before. If they are too tight, and a violent Inflammation ſucceeds, they may be relaxed at Pleaſure; but on the Decreaſe of the Inflammation they muſt be tightened again. Some, in the Room of Tape, uſe Claſps, made of Steel or Braſs, as we have deſcribed them at *Plate* IV, *Fig.* 9 and 10. But this Method is leſs convenient than the former, and therefore in very little Uſe.

The bloody Suture what.

XLIII. In large Wounds, eſpecially tranſverſe ones, as their Lips cannot be maintained in their Situation by the dry Suture, which is frequently the Caſe in Wounds of the Thigh, as you may ſee at *Plate* III, *Fig.* 1, *Letter* H; or in the Abdomen, Nates, or Arms; or where Pieces hang from the wounded Part, as in the Forehead, Cheeks, Noſe, or Ears; or when large Wounds are made in an angular or cruciform Manner, as at *Plate* IV, *Fig.* 12, 13, 17. here you muſt uſe the Needle, which Operation is called the *bloody*, or *true Suture*. The true Suture is diſtinguiſhed again into the *ſimple* and *compound*. The *ſimple Suture* is that which is performed only by the Aſſiſtance of the Needle and Thread; to this Claſs belong the *interrupted Suture*, the *Glover's Suture*, and the *twiſted Suture*. The laſt is ſeldom uſed but in the Hare Lip; the ſecond only in Wounds of the Inteſtines, under which Head we ſhall treat of it more largely; but the firſt is in common Uſe for all Wounds that require the true Suture, therefore we ſhall begin with the Deſcription of that before the reſt. The *compound Suture* is that which requires other Aſſiſtances beſides the Needle and Thread. Of that below.

How to perform the interrupted Suture.

XLIV. The beſt Method of making the *interrupted* or *knotted Suture*, I take to be the following one: Take a double Thread well waxed, paſs it through a

 ſtrong

ſtrong crooked Needle, as you may ſee *Plate* I, *Lett.* S, T, V, or *Plate* VI, *Fig.* 5 or 6. When the Lips of the Wound are brought together, and held firm in that Situation by an Aſſiſtant, with one Stroke pierce through them both, paſſing your Needle through the lower Lip from without inwards almoſt to the Bottom, and ſo on from within outwards, obſerving to make the Punctures at a Finger's Breadth from the Wound, (which in this Caſe we will ſuppoſe to be in Length two Fingers) varying this according to the Size of the Wound. After taking off the Needle, tie the Ends of the Thread, firſt in a ſingle Knot, and then in a ſlip Knot, covering all with the Dreſſings which we preſcribed in the dry Suture. But if the Wound is of ſuch a Length, that one Stich will not be ſufficient, then you may make two, three, or more after the ſame Manner that we have now deſcribed, always obſerving a Finger's Breadth Diſtance between each Stich. *See Plate* IV, *Fig.* 11 and 16. But to prevent the Knots from bringing on any Miſchief, lay a ſmall Linen Compreſs (*See Plate* II, *Fig.* 22.) over the ſingle Knot, and make the ſlip Knot over that; which, if any Pain or Inflammation ſhould ſucceed, may be eaſily looſened.

Some Cautions. XLV. We proceed in this Manner in oblique or tranverſe Wounds. But where there are Angles, as in a triangular Wound, *Plate* IV, *Fig.* 13. you are to proceed in the ſame Manner as before; only the Suture muſt begin at the Angle A; then the Sides of the Wound muſt be ſtiched about the Middle at B and C. If the Wound is quadrangular, or has two Angles like the *Greek* Letter Π, which ſometimes happens in the Face, *See Plate* IV, *Fig.* 14. then the Sutures muſt be made in both the Angles A A. But when the Wound is ſo large, that theſe are not ſufficient, then as many more as are neceſſary muſt be made in the middle Way between the Angles B B. When you meet with a cruciform Wound, as at *Fig.* 6 and 12. and the Lips of it cannot be kept in Contact by the Uſe of Plaſters, the Needle, as at *Fig.* 12. muſt be paſſed in at A, and come out again at B; it muſt enter again at C, and come out again at D; the Extremities of the Threads muſt then be tied in the Manner we have before directed, between A and D. How the Wounds are to be treated afterwards we ſhall explain below.

The compound Suture. LXVI. Some of the Surgeons amongſt the Ancients uſed a *compound* Suture for large Wounds, in the Room of the interrupted Suture, which was made of two Pieces of Wood, by the *French* called *Chevelle*; and from thence the Suture was ſtyled *Enchevillée*. And they preferred this, becauſe it prevented the Lips of the Wound from being lacerated, which ſometimes happened when the other Method was uſed, which not only prevented the Wound from uniting, but frequently brought on other grievous Diſorders. And though this Method has of late Years been rejected as inconvenient, and particularly by DIONIS in his Surgery; yet it is not at this Day without its [a] Advocates, who highly commend it, and prefer it to the interrupted Suture in many Caſes: But they uſe it with this Difference, that inſtead of two Pieces of Wood, they uſe Pieces of Plaſter rolled up in a cylindrical Form, of the Length of the Wound, and about the Size of a Gooſe Quill, from whence it is by ſome called the quilled Suture. *See Plate* IV, *Fig.* 17 and 18. This Method prevents Tumors, Pain, and Inflammations, that might be brought on by the Hardneſs and Preſſure of the

[a] As PALFYNUS, in Chirurgiâ, Cap. VI. de Suturis; and ſince, GARENGEOT in Chirurg. Cap. de Suturis.

Wood.

Wood. PALFYNUS performs this Operation, in deep Wounds of the muſcular Parts, (as the Thighs, Buttocks, Legs, Arms, *&c.*) with a large, ſtrong, crooked Needle, furniſhed with a ſtrong double Thread well waxed, (*See Plate* IV, *Fig.* 15.) which makes a Bow at one End. The Needle being paſſed through both Lips of the Wound, in the Manner we have before deſcribed, and a ſecond and third paſſed in the ſame Manner, as is ſhewn at *Fig.* 17. a Roll of Plaſter is to be introduced into the bow Ends of the Thread, which are left hanging out at BB. Then when the Needle is taken off at the other Side, another Roll is to be placed between the Ends of the Thread; and the Lips of the Wound being brought together, theſe Ends are to be gently tied over the Roll, firſt in a ſingle, and then in a ſlip Knot, as at CCC. If there are three Threads, you are to tie the Middle firſt, and then the reſt, treating the Wound afterwards, as we ſhall ſhew below.

XLVII. GARENGEOT performed this Operation much after the ſame Method we have juſt deſcribed, (*See his Book of Operations in Surgery*, Chap. iii. *on Sutures*) but with this Difference, inſtead of a double Thread, he made ſmall Ligatures of ſix or eight Threads (according to the Size of the Wound) joined together and waxed, always obſerving not to make it ſo big, that when it ſhould be doubled it ſhould exceed the Size of the Needle, leſt it ſhould create Pain, by not paſſing readily after the Needle. When a ſufficient Number of theſe Ligatures are paſſed through the Lips of the Wound, he makes a Knot upon each of the Ends that hang out of the upper Lip; *See Plate* IV, *Fig.* 18. DDD, and then unravels the Threads that compoſe the Ligature, between the Knot and the Lip of the Wound; and by this Means forms a Paſſage through which he can introduce the cylindrical Roll of Plaſter. After this he claps two Fingers upon the lower Lip of the Wound, near the Punctures which were made by the Needle, and with the other Hand draws back the Ligature gently, beginning in the Middle, if there are more than two, till the Wound is exactly cloſed: Then he divides the Threads of each Ligature into [a] two Parts, with which he ties the other Roll as before, nicely joining again the Lips of the Wound. In tying theſe Ends, great Care ſhould be taken not to make the Knots too tight at firſt, leſt they ſhould bring on Pain and Inflammation. The Wound is now to be covered with vulnerary Balſams ſpread on Lint, but eſpecially with the *Balſamum Præfecti Equitum Melitenſium*, which I have commended before, as it ſoon forms a healing agglutinating Cruſt, denies all Acceſs to the external Air, and brings on the deſired Union, to which you muſt add a Compreſs, a proper Bandage, and a convenient Poſture of the Part affected.

Another Method by GARENGEOT.

XLVIII. On the firſt Days, after whatever Method the Suture is performed, the Bandage and Compreſs are to be gently removed, and the ſtate of the Wound examined. If every thing looks well, and there is little or no Pain or Inflammation, the Sutures are to be let alone for ſix or ſeven Days, or longer, and the Wound be dreſſed up again as before, till it appears that there is a ſtrict Union procured. But if the Stiches ſhould appear to be too looſe, the Knots ſhould be tightened; if they are too tight they muſt be looſened a little. When the Lips of the Wound appear to be enlarged or bruiſed, they ſhould be dreſſed with a digeſtive Ointment, or with the *Balſamum Arcæi*, the con-

What is further to be obſerved.

[a] GARENGEOT here orders them to be ſeparated into three Parts, but what Uſe he puts the third Part to I can't comprehend; I am apt therefore to imagine, that there is ſome Omiſſion in this Place.

tinuance of which will presently remove all these Symptoms. But when the Wound is attended with great Inflammation and Fever, the Stiches should be somewhat loosened, the Patient should be let Blood, and live upon a thin Diet, and the Body should be kept open. These Symptoms being removed, the Stiches should be again tightened by degrees and the Wound dressed as above. But if these Applications should prove fruitless, and the Complaints should increase, so as to threaten Danger, the Stiches must be cut, and the Wound treated as if there was a loss of Substance, which Method we shall explain below.

What is to be done after the Wound is healed.

XLIX. On the other hand, if the Wound heals by the Assistance of the Suture, which you will be sure of, not only from observing the Lips of the Wound to lie close together and unite, but by the Relaxation of the Threads or Ligature upon the disordered Part; the Threads or Ligatures are to be cut near the Knots with Scissors, the lower Lip of the Wound is to be suspended with one hand, whilst the Threads are gently drawn out with the other. The Punctures that are left will easily heal by the Application of a vulnerary Water, called by the *French l'Eau d'Arquebusade*, or by injecting *Aqua Calcis*, or *Spiritus Vini*, and laying on Compresses dipped in the same Liquors. But larger Wounds are to be dressed with one of the beforementioned Balsams, and the Lips kept firm together with some sticking Plaster, till a firm Cicatrix is formed.

Of healing Wounds where there is loss of Substance.

L. Where there is loss of Substance, the Wound will not unite either by the help of Plasters or Suture, till it is filled up with new Flesh. For this Purpose you will find Lint dipt in Oil, or spread with some vulnerary Ointment or Balsam, and applied to the bottom of the Wound, very serviceable, covering it with a Plaster, Compress, and proper Bandages. This Dressing is to be repeated daily: though it is a very vulgar Error, to suppose that these Applications generate Flesh, which is produced by the circulating Fluids, that in a wonderful Manner are continually bringing something new to the wounded Parts. Yet it must be owned that Medicines of this sort conduce very much to the Generation of the Flesh, and to remove every thing that might hinder that End; therefore it is no wonder they are called *Sarcotic Medicines*. There ought to be a balsamic and emollient Quality in these Medicines, that they may not only resist Putrefaction, but may also soften the young Flesh, so that it may easily receive Additions from the Blood, and suffer itself to be elongated. Of this kind are the Oils, Balsams, and Ointments, which we took Notice of at *N.* XXXV, *and* XXIX.

How the Air is to be kept from Wounds.

LI. As hot or cold Air is very hurtful to Wounds, so it must by all Means be kept from them, for nothing will sooner corrupt the Juices, or shorten and dry up the vessels, and hinder the growth of new Flesh, than the Air. In order to prevent Inconveniencies from this Cause, the Surgeon should be careful not to remove the old Dressings till the fresh ones are got ready, and to be as expeditious as possible in applying them. Then the Wound must be filled up with Lint, dipped in Oil, or some emollient Balsam; to this must succeed some vulnerary Plaster, a Compress upon the Plaster, and last of all a Bandage, to bind and secure the whole.

How the Wound should be entirely healed.

LII. After this, when a white, even, thick Matter appears in the Wound, the Wound should be dressed as you shall see occasion; every Day, or every other Day, the superfluous Matter should be wiped away with a very light hand,

and

and it is better to leave some behind than to treat the Wound roughly. For wiping the Wound roughly hinders the Growth of new Flesh: but a little Matter being left, performs the Office of Oil or Balsam, keeping the Parts moist. These Rules being observed, new Flesh will presently spring up, and the Wound unite.

How a Cicatrix is to be formed.

LIII. But that nothing may be omitted which may seem necessary towards the perfect Cure of the Wound, the Surgeon ought to be industrious to procure an even Cicatrix. To this End it will be proper to dry by degrees, and to harden the Surface of the new Flesh, by the Application of dry Lint, covered with a tight Compress and Bandage. But when this is not sufficient, through a great Redundancy of Humours, it may be proper to use some of the drying Essences, or native Balsams at *N.* XXXIX, or drying Powders, such as *Tutia*, *Lapis Calaminaris*, *Mastichis*, or *Colophonium*. Rectified Spirit of Wine is frequently used for this Purpose with great Advantage, which carries a great astringent and drying Virtue with it.

How foul Wounds are to be treated.

LIV. When you perceive any Uncleanness or Foulness in a Wound, that is, if the Flesh is putrid, fungous, black, pale, or livid, it must be well cleansed before you attempt to heal. Different Methods have been proposed to execute this Intention; the Antients used Honey in this Case, *See* CELSUS, *Lib.* V. *Cap.* 26. *N.* 22. But the Moderns apply a digestive Ointment, made *ex Terebinthinâ Vitell. Ov. q. s. subactâ cum Mell. Rosar. q. v. admist.* But where this is not strong enough for their Purpose, they substitute *Unguentum Ægyptiacum*, *vel Vini Spiritu dilutum*, *vel digestivo admistum.* Some in the room of this use *Unguentum Fuscum Wurtzii.* To these digestive Ointments you may very properly add a small Quantity of *Aloës* or *Myrrh*, or, if you require still more Strength, *Mercurius præcipitatus ruber.* But the use of *Aqua Calcis* is well known to be very beneficial as a Detergent, especially if you add to a Pint of this *Mercurii sublimati gr.* xx. *vel* xxx. which from its known efficacy for this Intention, is called by the Surgeons *Aqua Phagædenica.* Applications of this kind are to be continued till the Wound is entirely clean; and then you are to have recourse to the vulnerary Balsams, and the Method prescribed at *N.* L.

How fungous Flesh is to be taken down.

LV. If the new Flesh should be luxuriant, and rise up so as to prevent the Formation of an even Cicatrix, it must be taken down by the *Vitriolum Cæruleum*; or in the room of this you may use a Powder composed *ex Alumine usto*, *Mercurioque rubro præcipitato*; at the same time making a proper Pressure with the Plasters, Compresses, and Bandages, till the Parts are even.

Rules to be observed by the Patient.

LVI. The Patient should particularly observe a strict Regimen, with regard to his Diet and manner of Living; that by avoiding every thing, that produce Crudities or Acrimony, the Blood may be rendered pure and uncorrupted. For nothing forwards the Cure so much as a good Habit of Body; which may be procured by observing a strict Regularity with regard to Diet, consulting which is the most proper Air to live in, keeping the Passions under, and neither indulging in too much Sleep, nor suffering too great Watchfulness. The greater Tendency there is in a Patient to a diseased State of Body, so much the stricter Course of Life ought he to observe.

What Air is best.

LVII. As to the Air, it ought to be temperate, and the Chamber should be equally guarded from Excesses either of Heat or Cold; for this Regulation is of Consequence in all Wounds, but most wonderfully so in those of the Head.

If

If the Patient is in any Danger of ſuffering from the Dampneſs of his Situation, it will be very proper to burn Amber, Frankincenſe, and Maſtich round him, to dry the Chamber. If he is in Danger from the Heat of his Situation, the Floor ſhould be frequently ſprinkled with Water.

What Diet is beſt.

LVIII. All Intemperance in Eating and Drinking is moſt diligently to be avoided. That ſort of Food is beſt which is moſt readily digeſted, for it makes a thin light Chyle and good Blood, which wonderfully aſſiſts the Wound in healing. For this Intention various ſorts of Broths may be recommended to the Patient, particularly thoſe that are made *ex Hordeo*, *Avenâ*, *Mannâ*, *Oryzâ*, *Scorzonerâ*, *Lactucâ*, *Endiviâ*, *Chærophyllo*, *Petroſelino*, *Cichorio*, *Aſparago*. He may eat Veal or Lamb, Pullets or Capons, Ale thickened with the Yolks of Eggs, ripe Fruits, particularly Apples, Cherries, or Plumbs; Vegetables alſo of ſeveral ſorts well boiled, to wit, *Spinachia*, *Lupulus*, *Aſparagi*, *Cinaræ*, *Lactucæ*, and moſt Pot-herbs. But Perſons of ſtrong athletic Conſtitutions, that cannot be ſatisfied with Diet of this kind, may be indulged in a more nouriſhing one, if they are attended with no violent Symptoms: But wherever there is any degree of Inflammation, the Patient muſt entirely abſtain from Fleſh, and all ſolid Food. Wounded Perſons ſhould conſtantly avoid admitting any thing *ſharp*, *ſalt*, or *ſpicy* into their Diet: For they give a Sharpneſs to the Blood, and increaſe its Heat and Motion, and conſequently occaſion Hæmorrhages, Fevers, and Inflammations. They ſhould therefore abſtain, eſpecially if they are of a hot Conſtitution, from every thing that is ſeaſoned, from Muſtard, Horſe-radiſh, and Onions. *All Meats that are difficult to digeſt, and breed a thick Blood*, ſhould alſo be denied; ſuch are all fat Meats, Lard, Bacon, Geeſe, Beef, either ſalted or cured, in the Smoke, Peas, Beans, and Lentils, eſpecially after they are dried, and all things of this kind.

What Drink is beſt.

LIX. The Patient's *common Drink* ſhould never be ſtrong: Therefore he ſhould be forbid the uſe of Wine, Spirituous Liquors, Mead, Strong Beer, *&c.* The ſmaller his Drink is, by ſo much is it the wholſomer. But in this Caſe we muſt always have a regard to the Conſtitution and Cuſtom of the Patient, and the Nature of the Wound. If he has been uſed to drink Water, he may go on in the conſtant uſe of it, or drink in its ſtead a Decoction of Bread or Barley mixed with Liquorice, Aniſeed, Fennel, or Citron Peel. Thoſe who diſlike Water may be indulged in good Small Beer, that is neither too new nor too ſtale: But if the Patient is in great Danger, and of a weak Habit of Body, you may preſcribe him a particular *vulnerary Drink*, to correct the viciated Fluids: But of theſe we ſhall treat more largely below, at *N.* LXIII, *and* LXIV.

Of Reſt, Motion, Watchfulneſs, and Sleep.

LX. The beſt Remedy for a wounded Perſon is *Reſt*. Therefore he ſhould be indulged in it, eſpecially with regard to the lower Limbs: For to walk, or even to move, is very pernicious. There are many Inſtances of wounded Perſons who have not only ſuffered grievous Injuries, but even Death itſelf, by violent Motions of the Body. Nor is too great Watchfulneſs of leſs Conſequence to the Patient: Therefore if Nature denies neceſſary Reſt, it muſt be procured by the Aſſiſtance of Medicines. To anſwer this Intention you may very properly preſcribe *Syrupi Papaveris albi* ℥ ſs *ad* ℥ i *ex Aq. Primulæ veris, vel Ceraſorum nigror. vel ex Emulſione Papaveris Semine, & Amygdalis dulcibus confecta.* When this appears to be too weak for the deſired End, you may give *Theriaca Venet.*

Venet. vel Confectio Mithridatii ad ℥i. *vel* ℥ii. *vel Opii puri gr.* i. in one of the Vehicles we mentioned above.

LXI. *The Bowels ſhould by all Means be kept open*, eſpecially in thoſe who have received a Wound in the Head, for they are ſubject to great Heat of Body, and are very apt to be bound. But obſerve in this Place, that ſtrong cathartic Medicines are to be avoided, for in ſo weak a State of Health they are of very ill Conſequence. But it is not only ſafe, but adviſeable to eat and drink thoſe things, that may at the ſame time nouriſh and keep open the Body. To this End the Patient may drink plentifully of *Tea* or *Coffee*, or may eat ſtewed Prunes; roaſted Apples alſo and Raiſins may be eaten for the ſame Purpoſe: but hard Meats of all kinds are to be forbid. Where the Patient is ſo bound up, that a Diet of this kind has no Effect upon him, it will be neceſſary to have recourſe to Medicines, but to thoſe of the mildeſt kind: you may here give a gentle Clyſter, or uſe a Suppoſitory, or preſcribe a Solution of an Ounce or two of *Manna, or ſome purging Salts*, in warm Broth, or a Draught compoſed of Tamarinds, Sena and Manna. But you muſt carefully avoid all reſinous and heating Medicines. The Bowels ſhould be kept open.

LXII. *Violent Paſſions of the Mind*; ſuch as Anger, Fear, Sorrow, Penſiveneſs, and particularly Luſt, ſhould diligently be avoided; and a quiet, ſerene, eaſy, chearful State of Mind preſerved; the contrary of which will never fail to bring on dangerous Symptoms. The Mind ſhould be free from Care.

LXIII. Whenever the Violence of the Wound, or the ill Habit of the Patient, require the uſe of *internal Remedies*, vulnerary Drinks will be found to be of the greateſt Conſequence in this place; in compoſing of which, the Conſtitution of the Patient, and the Nature of the Complaint ſhould be diligently conſulted: For they are in a great Error, who, according to the Cuſtom of common Surgeons, give one kind of vulnerary Potion for all ſorts of Wounds, and in all Habits of Body. For if your Patient is of a phlegmatic Habit of Body, cold, pale, naturally ſubject to Tumors, then the vulnerary Decoction ſhould be compoſed of Herbs that will attenuate and divide the Blood; ſuch as the *Radices quinque aperientes*, *Rad. Caryophyllat. Fœnicul. Gramin. &c. Herb. Sanicul. Alchymyll. Agrimon. Bettonic. Veronic. Philoſellæ*, *Pervinc. Virgæ Aureæ*, *Sophiæ Chirurgorum*, *Semen Aniſi*, *Fœnicul. Dauci*, *&c.* The Drink is preſcribed in the following Manner: Take two or three Handfuls of any of the beforementioned Ingredients, boil them gently for a few Moments in ſix Pints of Water, ſtrain it, and ſweeten it with ſome proper Syrup, ſuch as the *Syrupus Tunic. Betonic. Capill. Ven. Rad. quinque Aperient. De Cinnam. &c.* Give a Draught of this three or four times in a Day. You may alſo give Infuſions of the ſame Herbs, and made after the manner of Tea, ſweetened with Sugar. What internal Medicines are to be given.

LXIV. Some Perſons have a thin, ſharp Blood; in this Caſe it will be proper to adviſe Decoctions of viſcous glutinous Plants; ſuch as the *Rad. Symphyt. Liquirit. Polypod. Scorzoner. Sarſaparill.*; *Herb. Malv. Althææ. Verbaſc. Parietar. Mercurial.*; *Flor. Malv. Althææ*, *Verbaſc. Dactyli*, *Ficus*, *Jujubæ*; which may be prepared in the Manner we have juſt deſcribed, with the Addition of ſome of the *Syrup. Alth. vel de Symphyt. Liquiritiæ*, *vel Papaveris*, to give it an agreeable Taſte, if the Patient have no Averſion to Sweets. But if he is afflicted with great Pain or Wakefulneſs, then, beſides the Methods which we lay down at *Chap.* II, too alleviate Pain, you may give an Ounce or two of the Vulnerary Drinks for a thin, ſharp Blood.

Syrupus Papaveris albi vel de Meconio, mixed with the beforementioned vulnerary Drink, or with Emulsions *ex Amygdalis & papavere albo.*

Remedies against Acrimony and Heat.

LXV. If the Patient should be troubled with any Acidity, you may give him Powders every Day *ex Lapid. Cancrorum, vel ex Matre Perlarum, vel ex Conchis præparatis*, or any other Absorbents. But when you perceive a Quickness of Pulse, and an extraordinary Heat, they are sure Signs of a Symptomatical Fever: To relieve or take off which, the following Remedies will be found of Service. Give Barley Water with the Addition of some Tamarinds, and *Syrupus Mali Citrei vel Ribesiorum*; or some of the Powders mentioned above, saturated with Citron Juice, with the Addition of a small Quantity of Nitre. But in this Place it will be very proper for the Patient to lose some Blood, more particularly if he is young and full of Blood, or if the Pulse is strong and hard. In these Circumstances a *Physician* is more proper to be consulted than a *Surgeon.* But if the Patient is robust, and of a sound Habit, the best common Drink that can be prescribed, is Barley Water, or good Small Beer. What has here been said with regard to the Regimen to be observed by the Patient, as well with Respect to Diet as Medicine, I think is sufficient; and I heartily recommend the Observance of these Rules to all wounded Persons, but more particularly to those who are to undergo severe Operations in Surgery; such as Trepanning, Lithotomy, Extirpation of the Breast, Amputation of a Limb, or large Tumors. Whenever we shall have Occasion below to speak of the Regularity that Patients ought to observe in their Diet, I hope the Reader will endeavour to recollect what has been said upon that Head, that we may not be obliged to make tedious Repetitions.

CHAP. II.

Of the Disorders accompanying WOUNDS, *commonly called the* SYMPTOMS *of* WOUNDS.

I. *Of an* HÆMORRHAGE.

An Hæmorrhage how to be stopped.

I. PROFUSIONS of Blood atttending Wounds, all arise from Injuries of the Veins or Arteries. The Violence of the Hæmorrhage will be in Proportion to the Size of the wounded Vessel. Whoever considers this, will no longer wonder at the dreadful Consequences attending this Symptom, unless there be immediate Assistance; such as great Weakness, fainting Fits, and sometimes instant Death. No Surgeon therefore ought to be without a present Remedy to stop Blood. Though there are some Cases where it is by no means proper to restrain the Hæmorrhage instantly: For in a young, plethoric Habit, or where the Wound has been received in a drunken Fit, or in a Fit of Passion, it is best to let the Blood run, as long as it continues to do so without bringing on any Inconvenience upon the Patient: For by a moderate Loss of Blood, the Inflammation, Tumor, Pain, and Fever are prevented, or much lessened.

1. By dry Lint.

II. There are various Methods proposed to stop an Hæmorrhage. If none of the larger Vessels are wounded, you have your Remedy at hand, to wit,

dry

dry Lint, which you are to fill the Wound with pretty closely, covering it over with large Compresses, and making a proper Degree of Pressure over all with Bandages, and with your Hands: For more Service is frequently done in this Case by making a proper Pressure upon the Part with the Dressings, and with your Hands, than could be effected with more violent Remedies. But you must avoid too strict a Pressure; which often produces violent Pains, Inflammation, and at last even a Gangrene.

2. By astringent Medicines.

III. But if the Hæmorrhage is too large to be stopped by the Application of dry Lint, then *astringent Medicines* are to be called into Use. With this Intention the Ancients applied Rags to the Wound, which were dipped in cold Water or Vinegar, and covered them with Compresses wet with the same Liquors. Amongst the Surgeons of later Date, a certain Fungus called *Lycoperdon*, or vulgarly *Lupi Crepitus*, has been highly extolled for this Purpose: The Wound is filled with this in the room of dry Lint, and afterwards dressed up in the same manner as we directed above. The most common Remedy at present is *Spirit of Wine highly rectified*; this is applied cold to the Wound, filling it up with Dossils dipped in the same Spirit, and covering it with large Compresses wrung out of the same Liquor, making a proper Pressure over all with the Bandage. The same Virtues used to be ascribed to *Oil and Spirit of Turpentine*, applied in the same Manner as the Spirit of Wine. To this End also strong Solutions of *Alum*, *Vitriol*, or *Saccharum Saturni in Aquâ Plantaginis*, were recommended by many. Some dissolved Alum and the Vitriol together in the same Water, or, where they would have it of more Force, in Phlegm of Vitriol. Others make a styptic Liquor *ex Vitriol. Alb.* ℥ i, *& Aceti fortissimi* ℥ iii, applying it in the foregoing Manner. In this Place we are by no means to omit the Mention of *astringent Powders:* such as are made *ex Bolo Armeni*, *Lapide Hæmatite*, *Sanguine Draconis*, *Croco Martis astringente*, *Terrâ Japonicâ*, *Aloë*, *Olibano*, *Mastiche*, *Granat. Corticibus*, *Alumine*, *Saccharo Saturni*, *Terrâ Vitrioli dulci*, *Gipso*, *Hepate*, *Vitulino tosto*, and several other Medicines of this Kind, either alone or mixed in different Proportions, and sprinkled plentifully upon the Wounds, dressing them up with Lint, Compresses, and Bandages, as above.

3. By caustic Medicines.

IV. When Vessels of a larger Size are divided, it is usual to apply *caustic Medicines*, which act by their great Astringency. The Medicine chiefly used with this Intention, and indeed the safest, is *Vitriolum Romanum*, which being coarsely powdered and sprinkled upon Cotton, is easily applied to the Wound, dressing up with Dossils, Compresses, and Bandage. The *Liquor Stypticus Weberi* is also used here, and others of the like Kind, which have Oil of Vitriol in their Composition: But those Dressings only which are applied to the Bottom of the Wound are to convey these Medicines, otherwise the neighbouring Parts would suffer too great Corrosion. Those Medicines which are ended with a stronger caustic Quality than these, such as *Mercurius Sublimatus*, *Lapis Causticus*, *Oleum Vitrioli*, *&c.* can never be used with Safety, because they are constantly attended with violent Symptoms, from their too corrosive Faculty.

4. By dividing the Arteries.

V. But if these Applications prove fruitless, it will be proper to *divide entirely the Arteries which are only divided in part*, and occasion the Hæmorrhage: For by this means they will contract and hide themselves under the muscular Flesh, and the Orifices will be choaked up; at least they will more readily

yield to the Force of the Medicines recited above. This Method of Treatment is principally neceſſary in Wounds of the temporal Arteries, and of thoſe of the Cubits and Tibiæ.

5. By the actual Cautery.

VI. If this Method ſhould alſo fail, you muſt have Recourſe to the *actual Cautery*. The Orifices of the Veſſels being burned, a Cruſt is formed over them, and this Method is ſo effectual, that it is ſcarce poſſible for an Hæmorrhage to happen in Wounds of the external Parts, but what may be ſtopped by it. You ſhould in this Caſe always have two Cauteries ready, that if one ſhould be extinguiſhed before the Operation is finiſhed, you may be prepared with another. Cauteries are made of very different Shapes and Sizes, according to the Parts to which they are to be applied: I have given you eight different Sorts, for different Uſes, in *Plate* III, *Fig.* 9 to 16. There are two Inconveniencies which generally attend the Uſe of the Cautery, and ſometimes force us to neglect it. For firſt, not only the Patient is wonderfully terrified at the Apprehenſion of it, but Mankind in general look upon it as a Piece of Barbarity to adviſe the Uſe of it: When, to ſay the Truth, it does not occaſion ſuch violent Pains as are uſually apprehended from it; and what Pain there is in the Operation, is inſtantly over. But it is alſo attended with another Inconvenience of greater Conſequence; that is, the Eſchar, which is brought on by the Cautery, frequently falls off in two or three Days, eſpecially in the larger Arteries, from whence a freſh Hæmorrhage ſucceeds, and moſt likely a deadly one. To prevent this, two things are to be obſerved: Firſt to handle the Wounds tenderly at the Time of dreſſing; and ſecondly, to be provided always with a freſh Cautery, to repeat the Operation if neceſſary. This Caution is to be obſerved in the larger Arteries for fourteen Days: After this there is no greater Danger of a Return of the Complaint. But where the crural or axillary Arteries are wounded, the Cautery will be of no Service.

6. By Ligature.

VII. In very dangerous Wounds of the large Arteries, ſuch as the crural and axillary, and in Amputations of the Limbs, the ſafeſt Method is that of making a *Ligature* round the Veſſels. If this is performed by paſſing a ſtrong waxed Thread under the Artery by the Help of a crooked Needle, the Blood is preſently ſtopped, and the Orifices of the Artery coaleſce. Or it is ſometimes taken up with a Forceps, the Thread wound round it, and the Artery is compreſſed.

7. By Inſtruments.

VIII. Laſtly, ſeveral Inſtruments have been contrived to ſtop Hæmorrhages in different Parts of the Body. Formerly a large Iron Ring, furniſhed with a Screw, was in great Uſe amongſt the Surgeons; which they applied in ſuch a manner to the wounded Limbs, that by tightening the Screw which preſſed upon the Compreſſes, and other Dreſſings, it cloſed the Mouths of the Veſſels, and ſtopped the Flux of Blood. You may ſee Deſcriptions of this Inſtrument in SCULTETUS. But as this was a very inconvenient Inſtrument, and could only be applied to the Limbs, the Surgeons found themſelves under a Neceſſity of inventing a more convenient Inſtrument, that might be applicable alſo to the Arteries of the Neck or Head. An Inſtrument of this Kind you may ſee in *Plate* V, *at Fig.* 2. the Conſtruction of which is as follows: A Braſs Plate of three Fingers in Length, and two in Breadth, AA, is perforated in the Middle to admit a ſtrong Screw, BB, which is provided at the lower End with a ſmall round Plate, C: a Piece of Leather is ſtrongly faſtened to one End of the Braſs Plate,

Plate, of equal Breadth with it, E E, F F. In violent Hæmorrhages this Inſtrument is fitted to the wounded Part, and the End F is, by Means of Holes that are made in it, faſtened to the Hooks G G; ſo that the ſmall Plate C may preſs exactly upon the Compreſſes and Dreſſings that cover the Wound. All things being thus prepared, the Handle of the Screw, D, is to be turned round gently till a ſufficient Preſſure is made to ſtop the Blood; and then it is to be left in that Condition for a Day or two. But it muſt be entirely left to the Diſcretion of the Surgeon, when he ſhall think it prudent to alter the Poſition, or entirely to take off the Inſtrument. An Inſtrument of this Kind, with a longer Belt, will ſerve in Wounds of the Head and Temples.

IX. When we are ſpeaking of Inſtruments that are uſed to ſuppreſs Hæmorrhages, we muſt not omit the *Tournequet*, which we uſe with great Succeſs after Amputations. There are ſeveral things required to form this properly. The firſt thing to be enquired after is a ſmall Roller of a Thumb's Breadth, and about a *Paris* Ell in Length; in the next Place a little cylindrical Stick; then a conglomerated Bandage, two Fingers thick and four long; ſome Compreſſes of a good Length, and about three or four Fingers in Breadth, to ſurround the Legs or Arms. Laſtly, a ſquare Piece of ſtrong Paper or Leather, about four Fingers wide. 8. By the *Tournequet.*

X. We are now acquainted with the Nature of the *Tournequet*. It remains that we enquire which is the moſt convenient Manner of applying it. The rolled Bandage is to be applied to the Trunk of the wounded Artery lengthways, covering it in a contrary Direction with Compreſſes, ſurrounding the Leg, Foot, or Arm, as it were with a Ring. The Roller muſt be paſſed twice round theſe Applications, and faſtened in a Knot, but ſo looſely, that you may eaſily introduce your Hand between it and the injured Part: The Leather or thick Paper muſt be nicely placed under it upon the external Part of the Leg, or Arm, and the Roller tightened by Degrees, by turning the Stick round, (which is to be introduced into the Knot) till the Hæmorrhage is entirely ſtopped. The Stick muſt be kept in this Situation till the Wound is properly treated, and the Return of the Hæmorrhage prevented by proper Remedies, or by taking off the Limb. When this End is acquired, the *Tournequet* is to be looſened, or entirely taken off, as the Surgeon ſhall think convenient. But where it is applied to the Arm, the rolled Bandage is to be placed near the *Axilla*, in the internal Part of the *Humerus*, and the Stick in this Caſe is to be faſtened on the oppoſite Side; the Situation of the Artery requires this Poſition, *See Plate* III, *Fig.* 1, *Letter* K. When the Hæmorrhage happens in the Thigh, the Bandage is to be applied to the upper Part of the Thigh, or juſt over the Knee, as the Circumſtances ſhall require, in the ſame Manner as before, *See Lett.* L, M, N. But that you may have a clearer Idea of the Figure and Poſition of the *Tournequet*, we have given you a Draught of it, at *Plate* III, *Fig.* 2. How the *Tournequet* is to be appointed.

XI. PETIT, a Surgeon of the firſt Rank in *Paris*, invented another *Tournequet* in the room of this, which is well enough known by the Name of the Inventor. It is ſaid to have this Advantage over the other, that it will preſerve its Situation without requiring the Attendance of an Aſſiſtant: And beſides, that it may be left upon the Limb any given Time, without impeding the Circulation of the Blood: Whereas the common one entirely interrupts the Circulation of the Blood, and therefore cannot be kept on long. The Deſcription that I have ſeen of it is ſo ſhort and imperfect, eſpecially as the Parts of which it is compoſed PETIT's *Tournequet.*

are not described separately, that in many Places I could not understand it. GARENGEOT, *Tom.* II. *de Instrument. Chirurg.* differs a little in his Description of it, but he is by no means clear.

Our Improvement upon it.

XII. Therefore I have taken some Pains to correct it in the Manner you may see at *Plate* V, *Fig.* 6, A A describes the upper Part, B B the lower, and C the Screw; all in their natural Size, made of some strong Wood. At the Extremity D D there are two small Iron Screws, to which a strong Silk Roller is to be fixed, of the same width with the Instrument, but about twenty Fingers in length, that it may be long enough to encompass the largest Part of the Limbs, and be fastened at the small Hooks described at E. Both Extremities at F F are to be hollowed, that the Roller may lye quiet and firm. G describes an Iron Plate which is placed there to strengthen the Wood. The Wound therefore being properly dressed up, and the lower Part of the *Tournequet* guarded with a Bolster, is to be placed on the Side opposite the Wound; the Silk Roller is to be brought round the Limb, and being drawn very tight, is to be fixed to the Hooks E; and then by turning the Screw C, till a sufficient Pressure is made upon the Parts to stop the Flux of Blood, it must be left upon the Limb in this Situation, as long as the Surgeon shall deem it necessary. By means of this *Tournequet*, I have stooped an Hæmorrhage in a Wound of the crural Artery, and recovered the Patient without any Ligature or Amputation, in the presence of many Witnesses.

MORAND's *Tournequet.*

XIII. GARENGEOT, in the second Edition of his Book of Chirurgical Instruments, describes another *Tournequet*, invented by MORAND of *Paris*, of which he has given us a *Plate at page* 360. This resembles the former in many Circumstances, but differs from it chiefly in this, that in the room of a simple Screw, MORAND has substituted a compound Screw, that takes Place sooner; this he makes always of Steel; and it acts more in one Turn than the other can in two or three. This you may see more largely described, if you consult the Author himself. But GARENGEOT makes some Exceptions to this Instrument, and prefers PETIT's.

Another.

XIV. Some Years since, when I attended the Army, I was called to an Officer of Rank, who was dangerously wounded. I saw there a kind of *Tournequet* made of Iron, and very heavy, that much resembled MORAND's, but differed from it in some things, I do not know by whose Direction: But as I have never seen it described before, I have given you a Plate of it, *See Plate* V, *Fig.* 7. A is the lower Part pierced all round the Edges with several *Foramina*, by which means it will admit of a Bolster or Cushion to be sewed to it. B is an Iron Barrel to receive the Screw. C is the upper Part. D is another Barrel fixed upon that, for the Reception also of the Screw. E E are the Extremities of the upper Plate, one of which is supplied with small Hooks, the other with large Hooks, and with an Opening also to pass the Roller through and fasten it, almost in the manner we have described it in ours of *Fig.* 2, *and* 6. F is a kind of Ring, surrounding the Screw, above the upper Plate. G is a square Body made like a female Screw, for the Reception of the small Screw H, and the great Screw I K, which would otherwise fall down, but by this means is easily kept up in the Box D. L is an Iron Cylinder, which is firmly fixed in the lower Plate, but is loose in the upper: This keeps the two Plates in the same Situation

with

with each other, and at the ſame time admits the upper Plate to ſlide up and down freely, as occaſion ſhall require.

XV. I endeavoured to improve this Inſtrument, and ordered one to be made of Braſs after the Manner deſcribed at *Plate* VI, *Fig.* 1. In this the upper Plate AA, is much ſhorter than the lower CC; the Belt DD, is fixed at one End, and after it has been brought round the Limb, is faſtened to the other End by ſmall Hooks EE. The Belt paſſes through the lower Plate at both Ends by Holes made for that Purpoſe FF. The Inſtrument is by this Contrivance always kept even, and does not change its Poſture upon the Action of the Screw B. The Reader may chuſe which of theſe Inſtruments he thinks fitteſt for his Purpoſe; they will all anſwer the Intention they were made for; one does it ſooner, the other takes a little more time. But this Proverb will always have its force, *Sat citò, ſi ſat benè.* How the *Tournequet* is to be applied in Amputations of the larger Limbs, we ſhall ſhew in the proper Place. An Amendment of my own.

XVI. Before we take leave of this Article, it may be proper to inform you, that in Wounds of the large Arteries, *the internal uſe of aſtringent Medicines will be of no ſervice*; beſides, they frequently occaſion Pain, Inflammation, Fever, and other Diſorders, by making Obſtructions in the Lacteals, Meſenteric Glands, and other Veſſels; therefore it is beſt to lay them entirely aſide. What is to be done by internal Aſtringents.

II. *Of* PAIN *in* WOUNDS.

XVII. Pain may be reckoned amongſt the moſt grievous Symptoms that uſually attend Wounds: for great Watchfulneſs, Weakneſs, Convulſions, Inflammations, Gangrene, and even Death itſelf, ariſe frequently from this Cauſe. The *Cauſes* of Pain are many. 1. Sometimes an extraneous Body is left in the Wound, which occaſions great Irritations, eſpecially in nervous Parts of the Body. 2. Corroſive Medicines, which are ſometimes applied to ſtop the Hæmorrhage. 3. Or a large Obſtruction of the Blood may happen near the Wound, and bring on Tumor and Inflammation: This frequently happens in Plethoric Habits of Body, or in Gun-ſhot Wounds, becauſe in theſe Wounds there is uſually but a ſmall Diſcharge of Blood. 4. Laſtly, Wounds, or Tenſion of Nerves or Tendons may well be reckoned amongſt the principal Cauſes of Pain. Of Pain in Wounds.

XVIII. It will be well worth our while to conſult the Cauſe of Pain, that we may remedy it with the greater Eaſe: For all Pain will not admit of the ſame Remedy. Therefore, 1. *If any extraneous Body is left in the Wound*, the firſt Intention is to remove it, in the manner we taught at *N.* XXXI, XXXII, XXXIII. 2. *If the Pain ariſes from the Application of any corroſive or aſtringent Medicine*, it muſt be removed, or at leaſt moderated. This Intention will be anſwered by warm Milk, the Decoctions *ex Malvâ, Althæâ, Floribus Chamæmel. Sambuc. Melilot. Verbaſc. Sem. Lin. Papav. &c.* The Wound ſhould be cleanſed with a Sponge expreſſed from Decoctions of this kind, till nothing corroſive remains in it, and till the Pain is removed. Cataplaſms may be applied warm to the Wound, made of the foregoing Herbs. There are other Medicines alſo which Phyſicians preſcribe to be given internally to aſſuage Pain, as anodyne Emulſions. 3. *When the Pain ariſes from the Violence of the Inflammation*, which is frequently the Caſe, it will be proper to bleed as largely as the Strength of the Patient will allow: but if you cannot draw a ſufficient Quantity, you muſt ſcarify the Part, as near the Wound as is convenient, eſpecially in Gun-ſhot Wounds. Of Remedies for Pain.

By

By this Method the ſtagnating Blood is ſet at liberty, and the Inflammation and Pain are inſtantly relieved. In the mean time, you may foment the Wound *cum Oxycrato vel Spiritu Vini Camphorati*; or, which is much better, *cum Aquâ Calcis Vivæ modica portione Spiritus Vini Camphorati commiſt.* Emollient Cataplaſms, and ſuch Applications as we ſhall more largely treat of when we come to ſpeak expreſsly of Inflammations, take place here. Abſorbents ſhould be taken inwardly, ſuch as *Lapis Cancrorum, Conchæ præparatæ, Antimonium Diaphoreticum*, mixed with a moderate Proportion of *Nitre*. All things ſhould be forbid that increaſe the Circulation. Laſtly, 4. *Where the Pain ariſes from an Injury of the Tendon or Nerve*, the Cure is very difficult: For this Caſe is always attended with violent Inflammations and Convulſions. To prevent ill Conſequences that may happen in Wounds of this kind, it will be proper to dreſs with *Balſam. Peruv. Balſam. Copaib. Ol. Terebinth. vel cum miſturâ ex Ol. Terebinth. & Aq. Regin. Hungar. confect.* Theſe Medicines ſhould be moderately warmed before they are applied to the Wound, laying a Cataplaſm over the Dreſſings, compoſed *ex Herb. Scord. Abſinth. Abrotani, Flor. Sambuc. Chamæmel. &c. Vin. q. ſ. decoctis.* Internal *antiſpaſmodic* Medicines ſhould by no means be neglected in this Caſe. If the Pain is not leſſened by theſe Remedies, there is great Reaſon to deſpair, unleſs the wounded Part of the Nerve be inſtantly divided; for although this Method deprives all the Part of the Limb that lyes below the Diviſion of the Nerve of Senſe and Motion, yet in ſuch a deſperate Caſe it is better to loſe the uſe of a Limb than Life itſelf.

III. *Of* SPASMS *and* CONVULSIONS.

Convulſions, from whence.

XIX. Spaſms and Convulſions are brought on many ways: For they not only ariſe from all the Cauſes that occaſion Pain, but frequently from too great loſs of Blood. This appears from the many Examples of Men, and other Animals, that have died by the Violence of the Hæmorrhage. All theſe before they expire fall into ſtrong Convulſions and Diſtenſions of the Nerves. HIPPOCRATES mentions this as the worſt of Prognoſtics, *Alph.* 2. *Sect.* 5. "Convulſions, "ſucceeding a Wound, are mortal."

How Convulſions are to be cured.

XX. In order to remedy theſe Diſorders, it is neceſſary firſt to diſcover their Cauſe. Whenever Convulſions are occaſioned by extraneous Bodies, by corroſive Medicines, or by wounded Nerves, the ſame Methods are to be followed, which we adviſed for the Relief of Pain from the ſame Cauſes at *N.* XVIII. If they are occaſioned *by Inflammation or Fullneſs of Blood*, Blood-letting will generally bring Relief, eſpecially if we uſe at the ſame time the emollient Remedies adviſed at *N.* XVIII. If they are occaſioned *by an immoderate loſs of Blood*, Blood-letting is to be avoided, notwithſtanding ſome amongſt the *French* adviſe it in convulſive Diſorders ariſing from what Cauſe ſoever, *See* GARENGEOT, *in his Chirurgie*, Chap. 2. In this Caſe it will be better, by the Methods before adviſed, to ſtop the Blood, and to give the Patient warm Broth, warm Milk, and Draughts of warm Ale thickened with Yolks of Eggs, and ſweetened with Sugar; by this Method the Veſſels are filled again by degrees, and the Cauſe ceaſing, the Convulſions go off, In the mean time ſtrengthening Medicines ſhould by no means be neglected, particularly [a] Wine, Emulſions, and ſtrengthening Drinks.

[a] See CELSUS, B. V. Ch. 26. N. 25.

IV. *Of*

IV. *Of the* SYMPTOMATICAL FEVER.

XXI. If the Patient has a quick Pulſe, and an increaſed Heat, we ſay he has a *ſymptomatic Fever*. This Fever is of very dangerous Conſequence, and will quickly prove mortal, if not timely relieved by the Aſſiſtance of the Phyſician. Symptomatic Fever, what.

XXII. In order to cure Fevers of this Sort, the Phyſician ſhould forbid the Uſe of every thing, both in Medicine and Diet, that may encreaſe the Heat; and order ſmall Liquors to be drank plentifully, ſuch as Barley Water, thin Gruels, Ptiſans, *&c.* cooling Powders mixed with Nitre and Camphire ſhould be preſcribed. The Bowels ſhould be kept open with Clyſters, if they do not anſwer naturally. Where the Patient has loſt but a ſmall quantity of Blood, and is of a plethoric Habit, it will be right to open a Vein on the oppoſite Side to the Part wounded. A very thin Diet is to be adviſed, as *Decoct. Hordei*, &c. and in ſmall Quantities at a Time. Fleſh, and all ſolid Diet and Spices, ſhould be abſolutely forbid. Cure of the Symptomatic Fever.

CHAP. III.

Of GUN-SHOT WOUNDS.

I. GUN-SHOT Wounds are attended with much worſe Conſequences than Wounds that are made by ſharp Inſtruments: For, beſides the Effuſion of Blood, the Parts are more ſhattered and torn, eſpecially when the Shot falls upon the Joints, Bones, or any conſiderable Part. Gun-ſhot Wounds.

II. The Antients were entirely unacquainted with Wounds of this ſort, as they fought chiefly with ſharp Weapons, as Swords and Spears; or with Clubs, *&c.* For the Uſe of Gun-powder was not known till about three Centuries ago. Although many of the Ancients make Mention of Bullets, and of their being uſed in Engagements, yet they had neither Guns nor Gun-powder: On which Account they could not drive them with ſuch Force as the Moderns: For they either hurled them with a Sling, or ſhot them from a Croſs-bow. Whether known to the Antients.

III. Wounds of this Kind have a Cruſt or Eſchar formed upon them, and therefore are attended with little or no Hæmorrhage at firſt, unleſs ſome conſiderable Veſſels are wounded. But as ſoon as the Eſchar falls off, the Hæmorrhage is ſometimes ſo violent as to endanger the Life of the Patient, unleſs a Surgeon is at hand. For the five or ſix firſt Days there is little or no Diſcharge of Matter: Therefore it is not to be admired at, if Gun-ſhot Wounds, while the Veſſels are compreſſed by the Eſchar, exceed all others in Violence of Symptoms, ſuch as Inflammation, Pain, Gangrene, *&c.* Diſcharge ſmall quantities of Blood and Matter.

IV. The Eſchar which is formed upon theſe Wounds is not occaſioned, as many have imagined, ſo much by the Heat of the Bullets, as by the Rapidity with which they deſtroy the Parts, and the Violence of the Symptoms is owing chiefly to this Rapidity, whence enſues a violent Contuſion; and to the extravaſated Blood being long confined under the Cruſt. Formerly they were of Opinion, that there was ſomething poiſonous in Wounds of this ſort, but in this alſo they were miſtaken, for nothing poiſonous enters the Compoſition, either of the Powder or Ball. So far from it, that the Powder is uſed medicinally in acute Fevers.

How many Differences.

V. Gun-ſhot Wounds are ſome of them deep; ſome ſhallow, which only affect as it were the Surface of the Body, and perhaps take off a Piece of Skin or the Fat at fartheſt: Theſe are attended with leſs Danger, and generally with leſs Pain. In ſome the muſcular Parts alone are wounded, in others the larger Veins and Arteries, which often diſcharge ſuch a Quantity of Blood, as to endanger the Life of the Patient. Sometimes the Ball paſſes clear through; ſometimes it remains fixed in the Wound, and frequently carries Part of the Cloaths or Wadding with it. From the Difference of theſe Circumſtances different Symptoms ariſe. In others, again, the Bones are injured either by Colliſion or Fracture; and that ſometimes in the Body of the Bone, ſometimes in the Extremes or Joints. Whence commonly ariſe the worſt of Symptoms; and the Patient fares well, if he loſes only the Limb, and not his Life into the Bargain, eſpecially if the Joints of the Tarſus, Cubitus, Knee, Shoulder, or Thigh be violently ſhattered; unleſs the wounded Part, which is indeed almoſt the only Remedy, be cut off in Time. Gun-ſhot Wounds, which happen to the Viſcera, or the Contents of the Head, the Thorax or the Abdomen, as they fall on the nobler Parts of the animal Œconomy, generally end in Death, if not inſtantly fatal.

Of Wounds in the Cranium.

VI. Gun-ſhot Wounds, which affect the Cranium or Scull and the temporal Muſcles, are for the moſt part attended with great Danger: For even thoſe, that appear very ſlight externally, frequently bring on terrible Symptoms, by the Concuſſion of the internal Parts which they occaſion. For dangerous Fiſſures are often produced, of worſe Conſequence than even Fractures themſelves: Becauſe by this means the internal Laminæ of the Cranium are ſhattered; or the Veins and Arteries of the Brain burſt, in which Caſe the extravaſated Blood has no Vent, nor can the Splinters of the Cranium be extracted. Death therefore muſt be the Iſſue, unleſs prevented by the Trepan. If the Ball is lodged in the Brain, the Patients almoſt univerſally die: But, if it has pierced only one Side of the Brain, they may recover; which has been ſeen in Practice by myſelf and others. Yet all Injuries whatever of the Cranium and the temporal Muſcles, are attended with great Danger, on Account of the Nerves and Arteries in thoſe Parts, and are therefore to be treated with great Care and Circumſpection.

Of Wounds in the Thorax and Abdomen.

VII. In the Thorax, if the Heart, or its Auricles, *&c.* if the pulmonary Artery or the Aorta, the Trunk of the Vena Cava or the pulmonary Vein, or any of their larger Veſſels are burſt, they are generally mortal. But if no large Veſſel is wounded, you need not deſpair of a Cure; though the Patient is often troubled with a Difficulty of Breathing. If any Viſcus of the Abdomen is pierced by a Ball, as the Ventricle, Inteſtines, Liver, Spleen, *&c.* or any large Blood-veſſel, in its Contents, Death muſt be expected. But if the Liver, Spleen or Kidneys are only ſuperficially wounded, the Patient frequently recovers. So, if the Bladder ſhould be injured in the Part ſituated without the Peritonæum, theſe Wounds are generally healed. But, if the Ball reſt in the Bladder, it occaſions ſuch an Accretion of calculous Matter, that the Patient cannot be cured without cutting.

Cure of Gud-ſhot Wounds.

VIII. In the Cure of theſe Wounds, the Surgeon muſt in the firſt Place examine, whether the Wound be ſlight, or of a dangerous Kind. We term it ſlight, if the external Parts only are hurt, ſuch as the common Integuments, or part only of a Muſcle, wherever ſituated; if the Bones are not affected, and if

it

it be pervious. In these Cases, if there be no Hæmorrhage, the Crust is to be removed by Suppuration. To effect this, the best Method is, first to dress the Wound with soft Lint and a Compress; the second or third Day to fill it up gently with a digestive Ointment, or with Honey, as a most excellent Suppurative; then cover it with a Plaster and Compress, or a Compress alone; and lastly, to secure it with a Bandage. If such a Wound should be received in a Part, where Compresses and Bandages cannot conveniently be applied (as for Instance, on the Face) it will be sufficient to secure the Lint with a Plaster only. Let this Dressing be continued either every, or every other Day, till the Crust is separated, the Wound cleansed and incarned; and the Cicatrix will be happily formed by the Application of dry Lint.

What further to be done.

IX. When the Crust is removed, they generally apply balsamic Medicines; as all native Balsams, or Oil of Turpentine, or the *Eau d'Arquebusade*, which Method we by no Means disapprove; though indeed Wounds of this Kind are easier healed by being left to Nature, especially in sound and robust Constitutions. If any of the soft Parts are taken off by a large Ball in the Surface of the Thigh, Calf, Side, or Arm, the same Method of Cure is to be followed. If the Suppuration be too abundant, or the Flesh luxuriant, these Mischiefs must be removed by burnt Allum and red Precipitate; and the Wound must be dressed with Oil of Turpentine, *Balf. Copaiv.* or some balsamic Essence, as Amber, Myrrh, *&c.* or sometimes with dry Lint only. There are Cases, where the proud Flesh may be removed with the Finger. But in larger Wounds, when the Crust is cleared, you should avoid digestive Medicines, and apply nothing but spirituous Balsamics.

Inflammation.

X. If there happen in these Cases a violent Contusion or Inflammation, there is no better Method (especially if the Patient has lost little or no Blood by the Accident, and is of a plethoric Habit) than to make a wide and deep Incision in the Wound, the Neck only excepted, on Account of the large Vessels. After a sufficient Discharge of Blood, the Incision should be dressed with fine dry Lint, Compresses well saturated with warm Spirit of Wine, and a proper Bandage. If there has not been a sufficient Discharge, Venesection must be applied in plethoric Constitutions.

Hæmorrhage.

XI. But if an Hæmorrhage arise from a Wound in the fleshy Parts, it is a certain Sign that some large Vein or Artery is injured; for the small Vessels seldom bleed. In this Case styptic and balsamic Medicines, nay, the *Alcohol Vini* is always prejudicial; for they constrain the bruised Parts, check the Circulation, and of consequence either cause an Inflammation, or increase it; and too commonly pave the Way to a Gangrene and Mortification. Or, if Styptics should perhaps be particularly necessary, I would advise the *Nodulus ex Vitriolo*, or a small Compress dipped in the Styptic of WEBER or RABELIUS to be applied only to the Lips of the wounded Vessel, and pressed down with the Finger, till it produces a Scar, and the Blood is staunched. For these Wounds will bear the Application of much Lint, or the Stricture of Bandages. But the best and safest Way, is to close up the Mouth of the wounded Vessel with a Needle and Thread.

Of Wounds in the large Arteries.

XII. In Wounds of the large Arteries (the Situation of which the skilful Anatomist is not unacquainted with) that the Patient may not be lost by a violent Hæmorrhage, it is expedient, first to compress the Artery with your Thumb,

then apply the *Tournequet* to the wounded Limb, and by conſtringing the Trunk of the Veſſel, ſtop the Diſcharge: After this, you muſt take it up by means of the crooked Needle (*See Ch.* II, N°. VII.) But, if from the Narrowneſs of the Wound you cannot get at the injured Veſſel, it muſt be enlarged with the Scalpel, in order to reach the Artery and bind it up, or ſtop the Hæmorrhage by the Application of Styptics. The Wound ſhould afterwards be dreſſed with dry Lint, Compreſſes, and a Bandage. Nor ſhould theſe Dreſſings be renewed till the third or fourth Day, nor the Lint be removed for Fear of a freſh Hæmorrhage; but let it remain, till it quits of its own accord.

Gun-ſhot Wounds of worſe Conſequence.

XIII. But there are Gun-ſhot Wounds of worſe Conſequence than theſe. To which Claſs may be referred, 1. Thoſe where the Balls have not paſſed through; or where they, and other Bodies forced in with them, remain in the Part. 2. Where the Bones are at the ſame Time broken or ſhattered. And, laſtly, where the Viſcera, and larger Veſſels, or within or without their Cavities, are wounded; from whence ariſe very dangerous Hæmorrhages.

The general Method of treating theſe Wounds.

XIV. In the Treatment of theſe Wounds we muſt have Regard both to the Wounds themſelves, and the Accidents attending them. As to the Wounds themſelves, ſix Particulars are to be obſerved. As (1) If we perceive that the Ball has not paſſed through, which is plainly demonſtrated by a ſingle Aperture; in this Caſe we muſt endeavour with all Speed to extract the Ball, or other foreign Bodies forced in with it, ſuch as Cloaths, Wadding, *&c.* The ſame alſo is to be regarded with reſpect to Splinters of Bones: For, before theſe are removed, you in vain attempt to heal. (2) If there be a violent Hæmorrhage, it muſt be ſtopped by the Method abovementioned; but if it be ſlight, and from the ſmaller Veſſels, it is ſcarce worth attending to. For in the firſt Place it is often ſerviceable in plethoric Habits, by leſſening the Quantity of Blood, and thereby preventing Tumors and violent Inflammations; and it generally ſtops of its own accord; or is eaſily checked by applying dry Lint or a gentle Aſtringent. (3) Bruiſed and corrupted Fleſh ſticking in and about the Wound (which is called a Cruſt or Eſchar, if but a little) is eaſily taken off by a digeſtive Ointment, and Spirit of Wine, impregnated with *Sal Ammoniac:* If much, it cannot be removed without deep Scarifications and ſuppurating Medicines. (4) The Void of the Wound muſt be filled up with new Fleſh: (5) An even Cicatrix be formed: And (6) If any Bones are broken, they muſt be united.

Extraction of Balls and extraneous Bodies.

XV. With regard to the Extracting of Balls or other foreign Bodies, the Surgeon ſhould immediately enquire, except there be a violent Hæmorrhage, if any thing of that Kind remain in the Wound, and where. But here we muſt obſerve, that Balls, Stones, and other hard Bodies are eaſier diſcovered by the Finger, or Probe, than Fragments, or Cloaths, or Wadding: For theſe laſt, from their Softneſs, and the Redneſs occaſioned by the Blood, are very difficult to be diſtinguiſhed from the membranous and muſcular Parts, either by the Sight or Touch. But, to be ſurer in this Caſe, it is always uſeful, nay, generally neceſſary, to enlarge the Wound, and ſcarify; carefully avoiding the larger Veins and Arteries, but not regarding the ſmaller, the Nerves, or the Muſcles. This you muſt do, till you come at the foreign Bodies: The Extraction of which ſhould be performed, if poſſible, with the Hand; or, if that cannot be done, with a Forceps, or Hook, *See Plate* III, *Fig.* 3, 4, 5, 6, 7, 8. They are eaſieſt removed at firſt: For after ſome Delay the Tumor and Inflammation of the

Parts render it difficult and painful. Beſides, Bullets will by Degrees work themſelves deeper, and be buried under the Muſcles: Which will occaſion Fiſtulæ, Rigidity of the Limbs, and other Inconveniencies. In extracting Balls that lie deep, you muſt take great Care not to lay hold of Blood-veſſels, Nerves, or Tendons; which Accident will be avoided by introducing the Forceps ſhut, and not opening them till you feel the Ball.

Of Balls in the Bones or Joints.

XVI. When a Bullet is lodged in a Bone, we muſt endeavour to extract with the Forceps or Hooks, (*See Plate* III, *Fig.* 8.) If it lie too deep for theſe, we muſt have recourſe to the Trepan, as deſcribed *Plane* III, *Fig.* 7. or *Plate* VII, *Fig.* 7. *Lett.* B. But if this will not avail, Le Dran adviſes immediate Amputation. Yet in my Opinion, unleſs in Caſes of great Extremity, we had better leave the Ball, till the Parts ſuppurate, and ſet it at Liberty. Sometimes the Ball is removed by trepanning: Sometimes it remains a long while in the Bone without any Danger or Inconvenience: A remarkable Inſtance of which, I remember in an Officer, who for many Years carried a Bullet in the Middle of the Tibia, that gave him no Trouble. Whence it appears, that we ſhould not be too haſty in proceeding to Amputation. But if a Ball, or any other extraneous Body, be lodged in the Joint between two Bones, Celsus (*Book* VII, *Ch.* 5.) has very judiciouſly adviſed, to extend the Joint with your Hands, or by the Means of Bandages and Slings, as in the Caſe of Luxations: By which the Ligaments being looſened, Room is made between the Bones, for the eaſier Extraction of the foreign Body. I have often wondered that this excellent Precept of that great Phyſician ſhould be ſo generally neglected by the Moderns, as a thing of no Conſequence.

Of Extraction on the oppoſite Side.

XVII. Whenever the Ball has penetrated ſo deep into the wounded Part, as particularly in the Arm, Thigh, Thorax, or Abdomen, that you can eaſily feel it with your Finger on the Side oppoſite to the Wound, the Surgeon ſhould examine nicely whether it is ſafeſt to bring it back by the way it went in, or to make an Opening upon it, and draw it out at the oppoſite Side. When the Wound cannot be enlarged without Danger of injuring the neighbouring Parts, you ſhould ſearch for it with the Probe; and endeavour, but with great Caution, to extract with the Forceps, or ſome other convenient Inſtrument.

Of the Cure of fractured Bones.

XVIII. If the Wound is attended with fractured Bones, after the neceſſary Inciſions have been made, what Fragments are looſe, whether in the Cranium or elſewhere, ſhould be gently removed. If theſe Fragments ſhould adhere to the principal Bone by their fine Membranes, they muſt be cut off; and the larger Parts of the Bone, that are not much injured, be reduced to their natural Poſition, and retained there by proper Dreſſings, as in other Fractures. Where any Splinters ſtick out, which hinder the Reduction, and hurt the neighbouring Part, you ſhould break them off with the Forceps. If the Bones of the Tibia or Femur are broken, after they have been cleared of the extraneous Bodies, and reunited in the beſt Manner, they are to be dreſſed with the eighteen-headed Bandage, and repoſed in the Straw-couch, (Fr. *Fanones*) or in Petit's Machine, as in other complicated Fractures. Where a Wound is inflicted by a ſpent Bullet, or the Fragment of a Grenade, and the outward Integuments are not penetrated, though the Bone be broken; in this Caſe worſe Conſequences are to be expected from the Violence of the Contuſion. Therefore, to free a Paſſage for the extravaſated Blood, we muſt make deep Inciſions in the Integuments and

Muſcles, but not quite to the Bone. When the Blood is thus diſcharged, the broken Bone ſhould be replaced, and, if poſſible, dreſſed with the eighteen-headed Bandage. But Wounds of this Kind, eſpecially from large Pieces, generally take off the whole Limb, and too often the Patient himſelf.

Further Obſervations on Wounds in the Bones.

XIX. If the Joint be contuſed, and there be no Wound nor Fracture of the Bone, leſt dangerous Symptoms ſhould ariſe from any Injury of the Ligaments, Nerves, and Tendons, your Inciſion muſt be only in the Integuments and fleſhy Parts. But if a noxious Humour be found in the Joint, the Ligaments alſo muſt be cut to let it out. Veneſection and a proper Regimen are here very neceſſary, not without the Uſe of internal reſolving Medicines, and powerful Externals. But if the Bones in the Joint are broken or ſhattered, the Limb can ſcarce be ſaved, nor the Patient himſelf, unleſs you take it off a little above the Wound. In Contuſions of the Bones without a Fracture, if, after proper Inciſions, a violent Pain remains in the Bone; if the neighbouring Fleſh is pallid, the Bone of a darkiſh Colour, with a large Suppuration; in this Caſe either the Limb muſt be taken off, or, as LE DRAN adviſes, the Bone muſt be trepanned upon the Wound, to open a Paſſage for the confined Matter. If, in this Caſe, the Pains are very acute, unleſs you amputate, the Patient generally dies convulſive. The broken Bone, when rejoined and properly dreſſed, ſhould be conſtantly kept in an elevated Poſture.

In Caſe of Delay.

XX. If a Surgeon be not timely called in, and the extraneous Bodies remain long in the Wound, from whence ariſe Tumors, Inflammations, violent Pains, and other bad Symptoms; the Lips of the Wound muſt be greatly enlarged, and deep Inciſions made in the Tumors. By this Means you raiſe a freſh Hæmorrhage, the Swelling and Inflammation abate, and the foreign Bodies are eaſily extracted. But in all theſe Inciſions, eſpecially in the Limbs, the *Tournequet* ſhould be applied to the Part.

Of more extraneous Bodies.

XXI. But as two Balls are often concealed in the ſame Wound, after the Removal of one, the Surgeon ſhould diligently ſearch for another, or for any other extraneous Body that may be forced in with it: For unleſs every thing foreign be firſt removed, it is in vain to expect the Cure of the Wound.

Other neceſſary Obſervations.

XXII. When you attempt the Extraction of a Ball or other extraneous Body, you ſhould endeavour to place your Patient in the ſame Situation he was in at the Time of receiving the Wound: For by frequent Changes of the Situation, the Ball will eaſily bury itſelf, and get out of your Reach. If the Wound cannot eaſily be enlarged, nor the Balls extracted without great Pain and Danger, they muſt be left in the Wound, either till the Pain is abated, or the Paſſage rendered ſo eaſy by Suppuration, that they work themſelves out. On the other hand, extraneous Bodies are inſtantly to be removed, where there is Danger of bringing on Convulſions, Pain, or Inflammation, by being left behind.

Balls lodged in the Thorax or Abdomen.

XXIII. If a Ball has paſſed into any Cavities of the Body, where the Extraction of it cannot be attempted with Safety, it is beſt to leave it where it has lodged, and heal the Wound. For there have been Variety of Inſtances, where Perſons have carried Balls in them for many Years, nay, for the beſt Part of their Lives, without ſuffering any Inconvenience. It ſometimes happens that they work themſelves out into ſome other Part of the Body, from whence they may be extracted with Safety.

Balls lodged in the Viſcera.

XXIV. But if a Ball be lodged in a Viſcus, as the Brain, Lungs, Liver, Spleen, *&c.* that you can neither ſee, nor reach it, the Caſe is generally mortal.

If

If you can see it, it is only on the Surface. Therefore by enlarging the Wound of the Viscus, as far as is convenient, you will make room for the Pliers or Forceps to extract the Ball, which must be introduced with the utmost Caution.

XXV. When the Wound has been cleared of the extraneous Bodies, and the Hæmorrhage stopped, you must endeavour to remove the Eschar by Suppuration. In the next place you attend to the bad Symptoms arising from it, such as violent Swellings and Inflammations, Fevers, Gangrene, and Mortification, excessive Weakness, Nausea, *&c.* some of which are to be prevented, and others remedied. To prevent therefore violent Swellings and Inflammations, which are here always dangerous, and often bring on a Gangrene and Mortification; besides proper Incisions, you should apply externally *Spirit. Vini simp.* if the Wound be slight: if not very slight, add to each ℔ of the *Spirit.* ℥ ß of *Sal. Ammoniac.* or *Aq. Calc.* with about a fourth Part of *Spirit. Vini Camphor.* with a little of the *Sal Ammoniac.* Thick Compresses dipped in this Mixture should be applied warm to the affected Part several times in the Day. If in Parts that are contused and greatly inflamed, the Blood should be concreted under the common Membranes of the Muscles; these Membranes must be scarified without reserve, not only in their longitudinal, but in every Direction: for otherwise the stagnated Blood cannot be removed, and of Consequence a Gangrene and Mortification would arise, or at least very dangerous Abscesses. And sometimes you must cut even the Tendons, especially in Wounds of the *Tarsus* and *Metatarsus*, where you have acute Pains, that may be attended with Danger.

The Treatment of the Wound, when cleansed.

XXVI. Where there is a very great Corruption of the Parts, after repeated Scarifications apply the digestive Ointment; to which you may add a little Myrrh or Aloe, *Unguentum fuscum*, or red Precipitate. Let the Wound be dressed with these, till the injured Parts are separated, and the rest well cleansed. Then let it be treated as a simple Wound.

A great Corruption of the Parts.

XXVII. In deep Wounds where the Ball has gone quite through (especially if they happen in the Buttocks or Thigh, and the Passage of the Ball is oblique) a particular Method is to be used. After scarifying the Lips of the Wound, a Skein of Thread is to be drawn through the Eye of a long blunt Needle, (*Plate* V, *Fig.* 1.) and, being well saturated with the Ointment we have prescribed, passed through the Wound in the Manner of a Seton. It should be kept there, till you discover by the Redness of the Wound that the corrupted Parts are cast off, and the whole is in a readiness to heal. Le Dran absolutely rejects the Setons; but I have often seen the good Effects of them. You should take particular Care that the Thread be very soft.

Of Setons in Nervous Wounds.

XXVIII. Gun-shot Wounds, though in the strongest Constitutions, generally produce the worst of Symptoms; as excessive Weakness, Faintings, Tremors, Palpitations, Convulsions, Hiccoughs, *&c.* after which succeed instantly dangerous Fevers, nauseous Vomitings, and the like. All which require the particular Attention of the Surgeon.

Symptoms of these Wounds.

XXIX. Amongst the many terrible Symptoms attending these Wounds, the first is an excessive Languor, which is soon followed by fainting Fits, partly occasioned by the Hurry of their Spirits, and partly by the Effusion of Blood. If from the first Cause, Draughts or Mixtures composed of Cordial Waters, Cardiac Powders, and a strengthening Diet, are to be prescribed. If from the latter, to recruit their Strength and replenish their Veins, let them indulge in all

1. Weakness.

all things nouriſhing; as the *Decoct. Hord. vel Aven. Corn. Cerv. Citrat.* for their common Drink, with a ſmall Quantity of Wine or generous Beer, Milk, Emulſions, good Broths, and comfortable Juleps.

2. Nauſea. XXX. Some are ſeized with a violent Nauſea, or Abhorrence of Food. This ariſes partly from the Terror they are under, and partly from too great a Repletion before the Accident. It is too cuſtomary with military Men to eat and drink freely, as if by this means they acquired freſh Strength. Hence, on a ſudden Fright, the Motion of the Stomach being inverted, and the Digeſtion diſturbed, a Nauſea is the Conſequence. In ſuch a Diſorder, as Experience teaches, that thoſe who vomit ſpontaneouſly receive great Benefit, we ſhould here apply a gentle Emetic, and then ſettle the Patient's Stomach with a Cordial Draught. By this Method his Appetite and his Strength generally return; and the Cure of the Wound is happily promoted. If the Patient is averſe to an Emetic, you ſhould give ſome proper Purgative in its ſtead.

Vulnerary Fevers. XXXI. Intermitting Fevers in vulnerary Caſes are to be treated like others of the ſame kind: but be ſure to give an Emetic at the beginning. But if an acute Fever come on, attended with frequent Horrors, as they indicate ſtrongly internal Inflammations, we muſt bleed the Patient in Proportion to his Strength and Fullneſs of Blood: then order him a gentle Doſe of *Ipecac.*; ſome thin Liquor for his ordinary Drink; cooling Powders and Draughts, with Camphire, and a moderate Diet. He ſhould take largely of the *Peruvian Bark.* But he muſt particularly abſtain from Pork, from all ſalt Meats and of hard Digeſtion.

Pains and Convulſions. XXXII. Pains and Spaſms are generally produced, either (1.) By extraneous Bodies remaining in the Wound, which prick and vellicate the nervous Parts: or (2.) By large Tumors and Inflammations, which are always viſible: or (3.) By the violent Colliſion and Laceration of the nervous and tendinous Parts. If theſe Symptoms ariſe from foreign Bodies, we muſt endeavour to remove them as ſoon as poſſible. If from exceſſive Tumor and Inflammation, theſe muſt be diſcuſſed by the means above-mentioned. But if there be danger of a Gangrene and Mortification, beſides the deep Inciſions, frequently repeated for the diſcharge of the putreſcent Blood, and beſides the Medicines we before recommended, large Quantities of *Peruvian Bark* muſt be given inwardly; and Lint, well ſaturated with Spirit of Turpentine, be applied to the Wound. They are both excellent Remedies in this Caſe.

Amputation where neceſſary. XXXIII. But if all theſe Remedies fruſtrate our Hopes, there remains one only, and, as CELSUS obſerves, a deplorable Refuge, the Amputation or the corrupted Part. But, whenever violent Pains, Spaſms, and Convulſions are occaſioned by the Colliſion or Laceration of the nervous or tendinous Parts; it is adviſeable at the firſt, or very early at leaſt, to cut the Tendons, Aponeuroſes, and common Membranes of the Muſcles that are injured, juſt above the Wound. For if theſe Symptoms are not ſpeedily removed, Death muſt be the Conſequence. But if this avail nothing, it is better at once to amputate the Limb, than by unſeaſonable Delays deſtroy the Patient: for theſe partial Convulſions ſoon become univerſal.

Freſh Hæmorrhages. XXXIV. About the ſeventh or eighth Day, ſooner or later, from the inflicting of the Wound, freſh Hæmorrhages uſually ſucceed [a]. To ſuppreſs which, we

[a] When the *Eſchar* ſeparates.

muſt

muſt proceed, as above, and earneſtly adviſe the Patient to indulge Reſt, and ſtir as little as poſſible. Otherwiſe, theſe Hæmorrhages are too apt to return about the fourteenth Day.

In Caſe of a Looſeneſs.

XXXV. About the ſame time you have generally a Looſeneſs, which ſome think, not only unſalutary, but very prejudicial: but in general it ſhould be eſteemed ſalutary and critical; eſpecially in corpulent Patients, and of a bad Habit of Body: for thereby many bad Symptoms are abated; and a Wound, which before was unpromiſing, takes a new Turn, and a different Aſpect. Therefore we ſhould by no means check it with Aſtringents; but gently aſſiſt Nature with warm, diluting, lubricating, and mucilaginous Draughts; with *Ol. Amygdal. dulc.* with lenient Clyſters, till it ſtops ſpontaneouſly. But if it continue too long, we muſt then have recourſe to the aſtringent Powders; particularly *Pulv. Rhabarb. cum Cort. Caſcarill.* Theſe ſhould be repeated often in the Day; and at Night give a Doſe of *Diaſcordium*, or *Theriaca ex aquâ Menthæ vel Cinnam. Cydoniat.* Nor muſt a proper Regimen and Diet be omitted.

Venereal Symptoms, Fiſtulas, Caries and Atrophy.

XXXVI. If the Wound prove obſtinate from any Venereal Taint, which will eaſily appear from other Symptoms of that Diſorder, antivenereal Remedies muſt be applied. If there remain Fiſtulas, which are commonly occaſioned by Fragments of the Bones, or extraneous Bodies being left behind; or if there is a Caries; theſe Symptoms are for the moſt Part eaſily removed by removing the Cauſes. But if the Wound is inflicted on the Breaſt, and part of its Subſtance deſtroyed by it, the Caſe is too generally fatal. A Caries often requires length of Time and Patience: yet Nature, if aſſiſted with proper Medicines, frequently conquers it. It is no uncommon thing to ſee an Atrophy in the Limbs after violent Wounds, where the Parts are ſo lacerated, and the Circulation of the Blood ſo impeded, that they want their due Nutriment. In this Caſe, all ſtrengthening and emollient Medicines, all Ointments and Fomentations are extremely efficacious, and particularly the uſe of natural Baths.

To extract Gunpowder and ſmall Shot.

XXXVII. In Gun-ſhot Wounds ſeveral Grains of Gunpowder frequently penetrate the Skin of the Face, and occaſion a Deformity, if not removed: this may be done with a Pen, or an Inſtrument like an Ear-picker, *See Plate* VI, *Fig.* 14. But if they have penetrated too deep to be picked out in this manner, the Skin muſt be laid open with a fine ſmall Lancet, that you may remove them with the Inſtruments we have deſcribed. Great Care muſt be taken not to break the Grains in picking them out; for they will occaſion very foul Spots. The ſame Method is to be obſerved with regard to ſmall Shot. If you would be further informed of Gun-ſhot Wounds, and the Writers on that Subject, turn to the XII^th Number of the Introduction to this Work; and conſult particularly the excellent Le Dran.

CHAP. IV.

Of Wounds *of the* Abdomen.

The Intent of this Chapter.

I. WE have hitherto conſidered what was in general to be attended to with regard to any ſort of Wound, whether made by Cutting, Stabbing, or by the Exploſion of a Gun. We come in the next Place to explain fully the Nature

Nature of each particular Wound, and ſhall ſpeak diſtinctly of Wounds: 1. Of the *Abdomen*. 2. Of the *Thorax*. 3. Of the *Neck*. 4. Of the *Head*.

Differences of Wounds in the Abdomen.

II. *Wounds of the Abdomen* only affect the common Integuments and Muſcles, or penetrate into the Cavity of the Abdomen. Thoſe that penetrate into the Cavity of the Abdomen, are inflicted lengthways, obliquely, or tranſverſely, and in theſe the Bowels either burſt out through the Wound, or preſerve their natural Situation. Theſe differences of Wounds in the Abdomen ought to be diligently attended to by the Surgeon, ſince they require a different kind of Treatment.

How thoſe Wounds are to be diſcovered.

III. Theſe Wounds may be conveniently enough examined; 1. By the Eye; 2. By paſſing the Finger or the Probe; or laſtly, 3. By injecting warm Water into the Wound. If the Water meets with no Obſtruction, you are ſure that the Wound penetrates; but if it returns back upon you, and the Probe meets with Reſiſtance, the Abdomen is not entirely opened.

Wounds that do not penetrate.

IV. Wounds which do not penetrate the Cavity of the Abdomen, are attended with much the leaſt degree of Danger. They are generally divided into two ſorts. 1. Either the Wound is only upon the common Integuments; or, 2. The Muſcles alſo of the Abdomen are divided, as far as the Peritonæum. The firſt of theſe is too ſlight to require a diſtinct Method of Cure from other Wounds: but Wounds of the laſt Claſs are extremely dangerous; becauſe the Inteſtines, in this Caſe, eaſily fall through the Wound. If the Wound is large, great Skill is required in the Surgeon, eſpecially if it is made in a tranſverſe or oblique Direction. But if it is lengthways, by cleanſing the Wound, applying the vulnerary Balſam, and a healing Plaſter, with the large uniting Bandage, as at *Plate* V, *Fig.* 8. all will go well; if carefully dreſſed according to theſe Directions, and the Patient indulge Reſt, and obſerve a proper Regimen, the Cure generally is effected without a Suture. But ſhould the Wound be tranſverſe or oblique, in this Caſe to prevent a Rupture the Suture is neceſſary to keep the gaping Lips of the Wound together, as we ſhewed partly above at *Chap.* I, *N.* XLIV. The manner of performing this we ſhall deſcribe below in a Chapter upon *Gaſtroraphy*. Having taken theſe Precautions for preſerving the Peritonæum and Inteſtines in their natural Situation, the Surgeon ought to dreſs up the Wound with vulnerary Balſams, and an adheſive Plaſter: to give the Patient Reſt, to order him a ſoft Clyſter if his Bowels are not naturally open, and to enjoin Abſtinence.

How wounds are to be ſearched when they penetrate.

V. When the Surgeon diſcovers that the Wound penetrates into the Abdomen, he ought, before all things, to examine well, whether it be direct or oblique, and whether any of the Contents of the Abdomen partake of the Injury. He will eaſily determine in the Negative, if it ſhall appear; 1. That there is no great Degree of Weakneſs, Hæmorrhage, Pain, Fever, *&c.* 2. If upon laying the Patient upon the wounded Side, there is no diſcharge of Chyle, Gall, Excrement, or Urine. 3. If Milk, being injected warm,, returns without any Alteration of its Colour. 4. If the inflicting Inſtrument is not very ſharp; and laſtly, 5. If there is no vomiting nor diſcharge of Blood by the Mouth, Stool, or Urine, nor Swelling and Hardneſs of the Belly. But as the Operation of *Gaſtroraphy* is ſometimes extremely neceſſary, and always attended with Danger, if it is not performed with the greateſt Accuracy, I have thought it my Duty to deſcribe it carefully in the following Chapter.

CHAP.

CHAP. V.
Of GASTRORAPHY.

I. GASTRORAPHY is the Suture of Wounds of the Abdomen. This Operation is unneceſſary; 1. When the Wound is only in the muſcular Part; or, 2. Is not very large, eſpecially if it is made lengthways. For if the Wound ſhould penetrate into the Cavity of the Abdomen, and even let out Part of the *Omentum* or *Inteſtines*; yet, where it is very ſmall, as Wounds generally are which are made by Puncture, or happen lengthways, upon returning the Parts which are puſhed out, ſtopping the Wound up with a ſoft Tent, and ſecuring all with a proper Bandage, it may be healed without the help of the Needle. Beſides, in fat Perſons this Operation is very difficult, and it would be an act of great Cruelty in a Surgeon to perform the Operation upon a Man, when he might be cured after an eaſier Method. When Gaſtroraphy is unneceſſary.

II. But there are two Caſes where Gaſtroraphy is abſolutely neceſſary. The firſt is, where the Wound is ſo large, that there is no Poſſibility of retaining the Inteſtines by any other Method. For as the Inteſtines are continually puſhed forwards in the act of Inſpiration, by the Action of the Diaphragm and the Abdomen, the falling down of the Inteſtines in this Caſe is unavoidable, eſpecially in large Wounds from a Cut, *See Plate* III, *Fig.* 1, *Lett.* O, and therefore the Operation neceſſary. But there is another Caſe alſo where this Operation is required; to wit. in large tranſverſe Wounds of the Abdomen where the Muſcles are divided, but the Peritonæum is not concerned. *See above Chap.* IV, *N.* IV. When it is neceſſary.

III. In Wounds of the Abdomen the chief Enquiry is, *Whether the Omentum or Inteſtines are let out?* If none of theſe have burſt through the Wound, the Lips of the Wound ſhould be kept as cloſe together as poſſible with the Hands, and the Patient kept with his Head laying downwards till the Wound is ſufficiently ſecured from letting out the Contents of the Abdomen. But when the Inteſtines are already fallen out, they muſt be returned with the greateſt Expedition, leſt they ſhould receive any Injuries from the external Air. But we ſhould firſt examine whether they have received any Wound or not, and whether they preſerve their natural Warmth and Colour. For where they are cold, livid, and dry, or wounded, they are not to be returned ſuddenly, but treated in the manner we ſhall deſcribe below. Of the falling down of the Inteſtines.

IV. You will eaſily perceive that there is ſome Hurt in the Inteſtines, though the Wound does not immediately appear, if there is a more than ordinary Flaccidity in them. When this Symptom appears, it will be proper to pull the reſt of the Inteſtines gently forward, till you come at the Injury, and when you have found it, you may treat it as we ſhall ſhew you in *Chap.* VI. How to diſcover a Wound in the Inteſtines.

V. When you find the Inteſtines uninjured, they muſt be inſtantly returned, to prevent them from receiving any Injuries from the external Air. In order to do this with the greater Eaſe, put the Patient in the ſupine Poſture which we deſcribed at *N.* III, only placing him upon the Side oppoſite to the Wound. The Patient being thus ſituated, an Aſſiſtant ſhould endeavour to return the Inteſtine with his two Fore-fingers, taking Care not to take off one Finger till the other is upon the Gut. The Patient ſhould be encouraged all the while to How to return the Inteſtines.

hold his Breath, and the Aſſiſtant ſhould bring the Wound together with his Fingers, or with Hooks, *Plate* VIII, *Fig.* 2, 3.

How the Inteſtines are to be treated when they are dry and cold.

VI. Hitherto we have deſcribed the Method of returning the Inteſtine whilſt it was warm and unwounded: it remains that we teach the Method of treating the Inteſtines when they are cold and dry. In this Caſe it is beſt to foment them with warm Water or Milk before you return them; or, where you can have that Opportunity, get the Cawl of a Calf, a Lamb, a Hog, or of any other Animal juſt killed, wrap this round the Inteſtines whilſt it is reeking, and keep them in it till they recover their natural Heat and Colour. But if they do not return, all medicinal Efforts are vain: the Patient muſt die. If this Dryneſs or Coldneſs of the Parts is very ſmall, and the Inteſtines are not at all corrupted, it is beſt to return them inſtantly into the Body, where the Heat and Moiſture of the neighbouring Parts being natural to them, will give them a more ſpeedy and natural Refreſhment, than can be reconciled to them by any artificial Means.

How the Inteſtines are to be returned through a ſmall Orifice.

VII. When the Inteſtines are forced through a ſmall Wound, and are afterwards ſo diſtended with *Flatus*, that they cannot conveniently be returned, it will be proper to pull the Inteſtine gently forward, that more of it may come out, that ſo the *Flatus* being divided may take up leſs Room in any one Part. An Aſſiſtant ſhould now gently dilate the Wound with his Hands, or two Hooks, *Plate* VIII, *Fig.* 2, *or* 3. fixed in the internal Membrane, that the Surgeon may return the Inteſtines, which when he has done in ſuch a Manner that each Part may recover its natural Situation, (*See N.* V,) the Wound ſhould be ſecured firſt with his Hand, that the Bowels may not burſt out again. Then it ſhould be filled up with ſome Doſſils, or, where there is a conſiderable Quantity of Blood ſpilt in the Abdomen, with a ſoft[a] Tent, *Plate* II, *Lett.* L, M, N, O; dreſſing it up with proper Plaſters, Compreſſes, and Bandage. The Patient is to be kept as ſtill as poſſible, lying as much as he can upon the Wound. After this the Wound is to be dreſſed daily, or, where there is a large Diſcharge of Matter, twice every Day, with ſome vulnerary Balſam; and if we proceed in this Manner, where the Wound is not very large, the Patient may be excuſed from the Pain, and the Surgeon from the Trouble of making the Suture.

How ſmall Wounds are to be enlarged.

VIII. But if the Wound is ſo narrow, that we can neither bring the Gut forward nor reduce it, it muſt be enlarged with a Knife, or the grooved Probe, called *Conductor*, beginning the Diviſion at that end of the Wound which is moſt convenient, taking great Care not to wound the *Linea Alba*, the Veſſels which lie under the *Muſculi Recti*, or, laſtly, the Inteſtines themſelves. Some Surgeons, in the Room of the Inciſion Knife and Conductor, uſe in this Place the *Syringotomus*, whoſe Point is guarded with a Button, and which is uſed in *Fiſtulâ Ani*, (*See Plate* XXXV, *Fig.* 4, 5.) Some are fond of other Inſtruments; but I

[a] See CELSUS, Book VII, Chap. 16.

Some of the modern Writers in Surgery, particularly GARENGEOT, forbid the uſe of Tents in all *Wounds of the Abdomen*. In the Year 1734, a young Surgeon in my Neighbourhood obſerved this Rule, when he was called to a Man that had received a Wound between the Navel and the Penis, the Wound penetrated the Abdomen; for the firſt two Days the Symptoms were favourable, but upon the fourth Day he died. Upon opening his Body, we found a large Collection of Matter in the Abdomen, with the Omentum putrified. If a Tent had been uſed, the Matter would have been diſcharged, and the Patient's Life ſaved.

think

think the beſt Inſtrument by far in this Caſe, is the Knife which I invented for this Purpoſe, and have given you a Deſcription of at *Plate* V, *Fig.* 3. or one of thoſe at 4 and 5. The Knife is never to be uſed, till the Aſſiſtant has applied a warm Omentum to the Inteſtines that are already extra-abdominal, to prevent them from Injuries. But where the Inteſtines are ſo inflated, that it is impoſſible to get the Probe End of the Knife, or a Conductor into the Abdomen, then hold back the Inteſtines with the Left-hand, and with the Right make an Inciſion through the common Integuments and Muſcles as far as the Peritonæum; ſponging up the Blood as you go on. The Wound will moſt likely be ſufficiently relaxed by this to make way for the Readmiſſion of the Inteſtines, at leaſt it will admit the End of the Knife to divide the Peritonæum, ſo that you may enlarge your Wound at Pleaſure, and return the Gut as directed at *N.* V.

How to return them without enlarging the Wound.

IX. If any hardened Excrement lies in the Inteſtine, and impedes its Reduction, emollient Fomentations and Cataplaſms ſhould be applied, and more of the Inteſtine ſhould be pulled out; for by this Means the Fæces may be divided by the Hands, and the Inteſtine returned conveniently. PARÆUS and other Surgeons have recommended a particular Method of returning the inflated Inteſtine without enlarging the Wound, by making ſmall Punctures in the Inteſtine with a Needle, through which Punctures the wind will certainly eſcape, and the Sides of the Gut ſubſide: and this, they affirm, is attended with no Danger. Nevertheleſs, for my own Part, I prefer the Enlargement of the Wound to making theſe Punctures, and to the pulling out of a greater Share of the Inteſtine to divide the Contents; eſpecially ſince many Surgeons affirm, that theſe Punctures are neither ſafe, nor uſeful for the End to which they are directed. BLANCARD has given us an Inſtance where they failed, in his *Collect. Medico-Phyſic. Part. ult. Obſ.* I.

When and how to heal the Wound without the Operation.

X. When the Inteſtines are returned, if the Wound is not large, and is made lengthways, there will be no Occaſion to perform the Operation; which is always of dangerous Conſequence, and therefore ſhould never be attempted but in Caſes of the greateſt Emergency. If the Suture is not abſolutely neceſſary, paſs a ſoft Tent into the lower Part of the Wound, and apply ſticking Plaſters to the Sides of it, covering them with long thick Bolſters, ſecuring theſe Dreſſings with a uniting Bandage, ſuch a one as you will find deſcribed in *Plate* V, *at Fig.* 8. When the Patient is thus dreſſed, draw ſome Blood from the Arm, to prevent an Increaſe of the Inflammation; adviſe him to keep very ſtill, and obſerve a ſtrict Regimen with regard to his Diet. The Dreſſings are not to be removed, unleſs ſome violent Symptom requires it, before the third Day; and afterwards only once a Day, or rather every other Day, leſt the Union of the Wound ſhould be retarded by frequent Handling. On the other hand, if the Wound is large, and made in an oblique or tranſverſe Manner, as deſcribed *Plate* III, *Lett.* I, O, ſo that the Inteſtines cannot be kept within the Abdomen by this Method, the Operation muſt be performed without Delay.

How to perform the Operation with two Needles.

XI. The Operation may be performed in the following Manner: Paſs a ſtrong double or quadruple Thread, well waxed, through two crooked Needles; (*See Plate* VI, *Fig.* 5 *and* 6. or another, which was communicated to me by a Friend, at *Fig.* 7.) with theſe ſtich up both Ends of the Wounds, beginning at one End with the upper Lip of the Wound, paſſing the Needle through the

Patritonæum, Muſcles of the Abdomen, and the common Integuments, from within outwards, leaving about a Thumb's Breadth between the Stiches and the Mouth of the Wound, that they may take the ſtronger Hold, obſerving the ſame Method in paſſing the other Needle through the lower Lip. Whilſt you are paſſing the Needle with one Hand, it will be proper to ſupport the Lips of the Wound with the other, to prevent the Inteſtines from being wounded. It will frequently be very difficult to hold the Needle ſteddy with the naked Hand; to remedy this Inconvenience, the modern Surgeons have invented an Inſtrument to receive the Needle, and form a Handle for it, which the *French* call *Portaiguille*. *See Plate* VI, *Fig.* 2, 3, *and* 4.

With a ſingle Needle.

XII. If you are not provided with two Needles, the Operation may be performed with one: For, after you have ſtiched up one End of the Wound in the Manner we have deſcribed, you may take off the Needle, and perform the ſame Operation on the other End, and proceed afterwards as uſual. Likewiſe, inſtead of Thread, a ſmall kind of Lace[a], compoſed of ſix Threads, may be judiciouſly ſubſtituted; as the Threads themſelves are liable to break, or they may ſometimes cut through the Lips of the Wound, and deſtroy the Suture.

Large Wounds require many Stiches.

XIII. In a Wound of a middling Size, that is to ſay, of about two Fingers Breadth, one Stich in the Middle will be ſufficient: But in larger Wounds, the Stiches muſt be repeated in Proportion to their Size, leaving a Thumb's Breadth between each of the Sutures, the Extremities of the Thread hanging down on each Side, as we have ſhewn you in *Plate* III, *Fig.* 17. and in *Plate* IV, *Fig.* 15. Having made the proper Number of Sutures, an Aſſiſtant ſhould keep the Lips of the Wound together, whilſt the Surgeon faſtens the Ends of the Threads in Knots.

How the Knots are to be made.

XIV. Both Ends of the Thread are to be taken up, and to be tied firſt in a ſingle, then in a ſlip Knot, as we taught above in *Chap.* I. *N.* XLIV *and* XLV. paſſing a ſmall Bolſter between the two Knots, (*Plate* II, *Fig.* 22.) to prevent the Skin from being hurt. Where there are more Sutures than one, you muſt begin at the upper Part of the Wound, tying them down in Order, that, before the laſt is tied, a ſoft Tent, of the Size of a Finger, with a Thread faſtened to the End of it, may be introduced into the lower Part of the Wound. This Tent will keep a Paſſage open for the Evacuation of grumous Blood or Matter, which may be collected in the Cavity of the Abdomen. Some of the modern Surgeons, particularly GARENGEOT, abſolutely forbid the Uſe of Tents in theſe Wounds; and aſſert, that the Spaces left between the Sutures will afford a ſufficient Paſſage for the Diſcharge of Matter from the Abdomen; but I believe this frequently proves to be very falſe. See the Obſervation which we have added by way of Note to *N.* VII. *of this Chapter*. This one Fact has more Weight with me than all the ingenious Reaſons that can be brought to ſupport the contrary Opinion.

How the Wound is to be dreſſed after being ſtiched.

XV. The Stiches being all tied, and the Tent paſſed into the lower Part of the Wound, the Wound ſhould be well anointed with ſome vulnerary Balſam, and covered with Pledgits of Lint, a ſticking Plaſter, and Bolſters, ſecuring all with the ſcapulary Bandage. *See Plate* III, *Fig.* 1, *Lett.* B, C. At every Dreſſing the Surgeon ſhould be very cautious in removing the Bandage, Bolſters,

[a] See PALFINUS's Surgery, *Cap. de Gaſtroraphia.*

&c.

&c. the Tent ſhould be taken out, and the Patient turned upon the wounded Side, that if any Matter is collected in the Cavity, it may be eaſily diſcharged. Where there is a large Collection of Sordes, it will be proper to prepare a *vulnerary Injection, ex Decocto Herbæ Agrimoniæ, Saniculæ vel Hyperici, admixto Roſarum Melle.* This Medicine ſhould be thrown by a Syringe moderately warm into the Cavity of the Abdomen twice or thrice at every Dreſſing, turning the Body afterwards upon the Wound, that the Blood and Matter, which are mixed with the Injection, may be evacuated with it. Having proceeded in this Manner, paſs a new Tent into the Wound, moiſtened with ſome digeſtive Ointment, and dreſs up as before. This Method of cleanſing the Parts, and dreſſing the Wounds, is to be repeated daily, till there remain no Signs of any Foulneſs within. After this the Tent may be removed, and the Wound healed after the uſual Methods. To forward this Intention, Reſt and proper Regulations in Diet are very ſerviceable, adviſing the Patient to lye as much as poſſible upon the Wound, placing a ſoft Pillow immediately under it; for, by this Poſture, the Matter meets with a more ready Diſcharge; and the Lips of the Wound are induced to heal, from conſtant Preſſure.

XVI. Thoſe Wounds alſo require the Suture, which are extended as far as the *Peritonæum*, though they do not break through it into the Cavity of the Abdomen: For in this Caſe the *Peritonæum* is in conſtant Danger of being too much diſtended, from the vehement Motions of all the Parts of the Abdomen, in Breathing, Riſing, Walking, at the Expulſion of the Excrements, *&c.* Upon the Relaxation of this Membrane the Inteſtines would ſoon make their Way between the Muſcles, and bring on very bad Symptoms and dangerons *Herniæ*. Theſe Miſchiefs cannot better be prevented than by performing the Operation deſcribed above at *N.* XI, XII, XIII. but we muſt obſerve in this Caſe, that as the *Peritonæum* is not wounded here, the Needle muſt paſs only through the Muſcles, and common Integuments. Another Caſe which requires this Operation.

XVII. The Surgeons for many Years performed this Operation of ſtiching up Wounds of the Abdomen with the interrupted Suture, and preferred that to all other Methods. But ſeveral amongſt the Moderns, as we hinted above, prefer the quilled Suture (by the *French* called *Enchevillée)* in all large deep Wounds, but more particularly in Wounds of the Abdomen. For as the Muſcles of the Abdomen, above all other Parts, are ſubject to violent Motions in Breathing, Sneezing, Coughing, and from many other Cauſes, by which Motions the Threads have ſometimes burſt through the Lips of the Wound, and great Miſchiefs have enſued; ſome modern Surgeons therefore, and particularly DIONIS, have introduced the quilled Suture again in this Caſe, which had been before rejected. But to prevent the Lips of the Wound from ſuffering by the Preſſure of the Pieces of Wood, which were formerly uſed in this Suture, he ſubſtitutes Rolls of Silk ſpread with ſome Plaſter in their Room, as we ſhewed above, *B.* I, *Chap* I, *N.* XLVI. and at *Plate* IV, *Fig.* 16. by which Method the Cure will be effected more ſucceſsfully, and with more Eaſe to the Patient. In large tranſverſe Wounds of the Abdomen, which do not paſs through the *Peritonæum*, PALFYNUS adviſes the Uſe of this Suture, which is to be performed according to the Method I have deſcribed above in the firſt Chapter, *N.* XLVI. The quilled Suture uſed here.

XVIII. GA-

GARENGEOT's Method.

XVIII. GARENGEOT prefers this Suture to all others, even in Wounds that penetrate into the Cavity of the Abdomen, and recommends the following Manner of performing it. Inſtead of a double Thread, he twiſts ſix or eight ſtrong Threads together, like a Lace, and waxes them well, paſſing them through the Eye of a large crooked Needle, ſuch an one as is deſcribed in *Plate* VI, *at Fig. 5 or 6.* The Surgeon takes hold of the Needle at the blunt End with his Right-hand, and paſſes the Thumb of his Left hand into the Wound, raiſing the upper Lip with it, whilſt he fixes the Fingers of the ſame Hand upon the external Part of the Lip: He then introduces the Point of the Needle into the Abdomen, and raiſing it up about two Fingers Breadth from the Opening of the Wound, pierces through the *Peritonæum*, Muſcles, and common Integuments. Then taking off the Needle, he fixes it to the other End of the Thread, and lifts up the lower Lip of the Wound, by introducing his fore and middle Fingers under it, and clapping his Thumb upon the external Part of it; and pierces it with the Needle in the ſame Manner he did the upper Lip. If the Wound is four Fingers long, it will be neceſſary to make two Stiches, at equal Diſtances from each other, and from the Extremities of the Wound; if it is leſs[a], one will be ſufficient; if it is larger, more than two are required. The Threads are to be unravelled and divided into three equal Parts at each End; through two of theſe Parts the Rolls of Plaſter are to be paſſed on each Side of the Wound, and to be faſtened on with bow Knots. Then the *Balſamum Arcæi* muſt be laid on with ſome Lint, and that faſtened again, though not too tight, with the remaining Part of the Threads, in the ſame kind of Knots. The Abdomen is to be well bathed *cum Oleo Roſarum calido pauco Spiritu Vini admiſto.* This Embrocation is to be uſed chiefly upon the Parts near the Wound, and about the Region of the Navel; a large Bolſter wet with the ſame Medicine is to be applied to theſe Parts, and over this another dipt *in Oxycrato calido.* Theſe Applications are to be covered with Flannel well ſoaked in an emollient Decoction: The whole is to be ſecured with the Scapulary Bandage and Napkin; the Napkin is ſuſpended by the Scapulary, which in this Caſe ought to come ſomewhat lower than uſual. *See Plate* III, *Fig.* 1, C.

How to heal the Wound.

XIX. When the Lips of the Wound about the Sutures appear to be united, which you will perceive by the looſening of the Threads, you may cut the Knots, one after another, either at the ſame Time, or on different Days, as you ſhall ſee Occaſion: And when you have gently drawn them away, as we taught you at *N.* XLIX, the reſt of the Cure will eaſily be performed by the Aſſiſtance of ſome vulnerary Balſam and ſticking Plaſters. You muſt take great Care not to draw the Stiches too ſoon, for by that Means the Lips of the Wound would burſt open again, and bring on grievous Miſchiefs. Beſides, a Bandage muſt be continued on the Abdomen for a conſiderable Time.

EXPLANATION *of the* THIRD PLATE.

Fig. 1, *Letter* A, Deſcribes how the *Grand Capital Bandage* is to be applied after the Operation of the Trepan, or after Wounds of the Head.

[a] GARENGEOT, *Operat.* Tom. I. p. 220. Edit. 2d. But I wiſh he had been more accurate in deſcribing how the quilled Suture could be performed by one Puncture; for two at leaſt are required to keep the Quills firm.

B, The

Fig: 1.

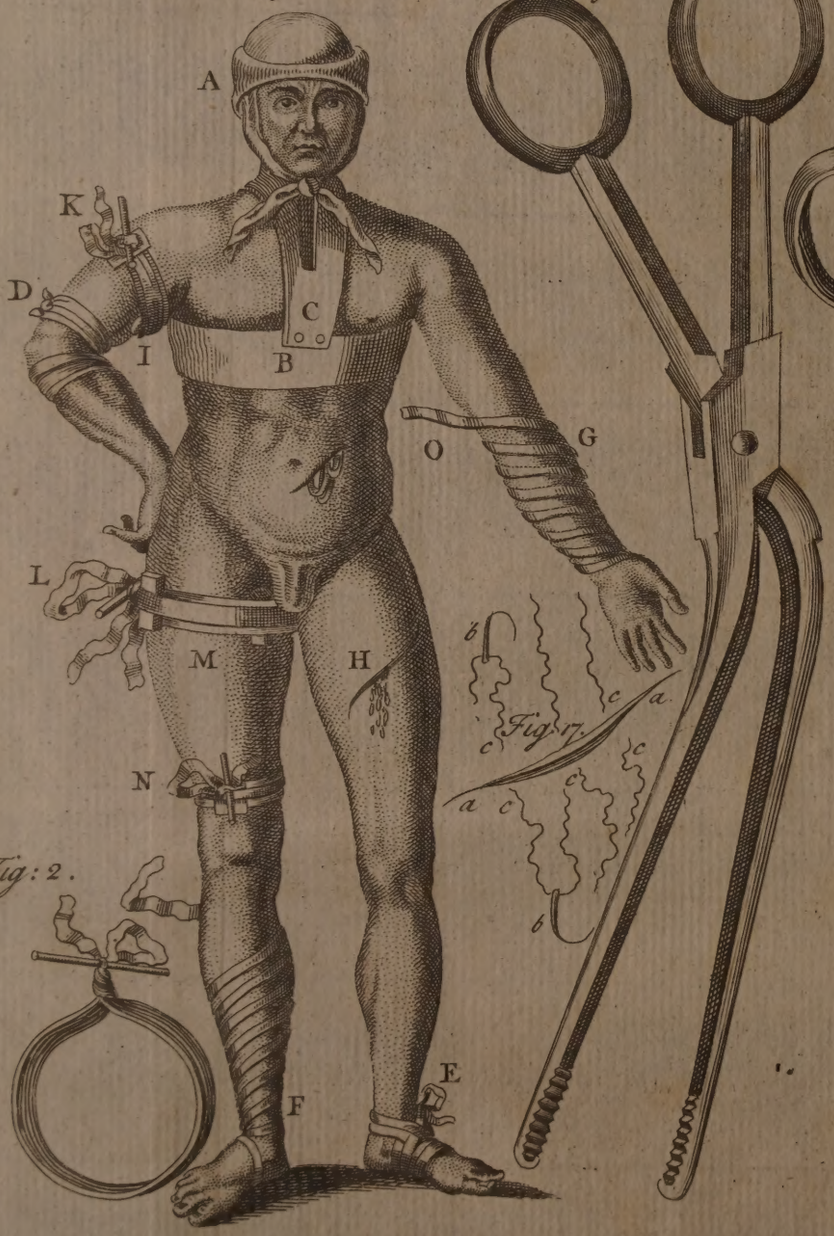

Fig: 2.

Fig: 3.

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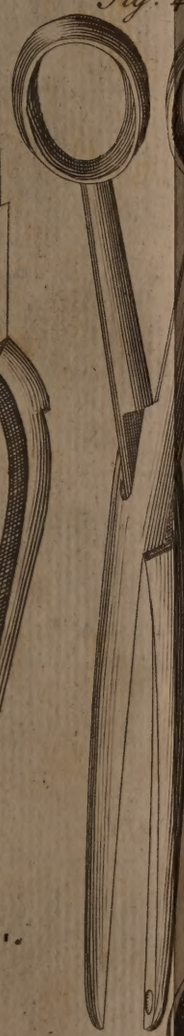
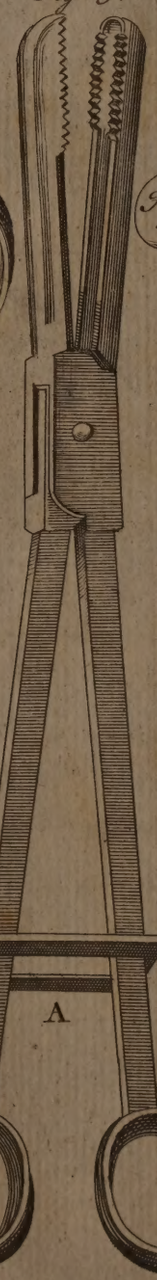


Fig: 5.



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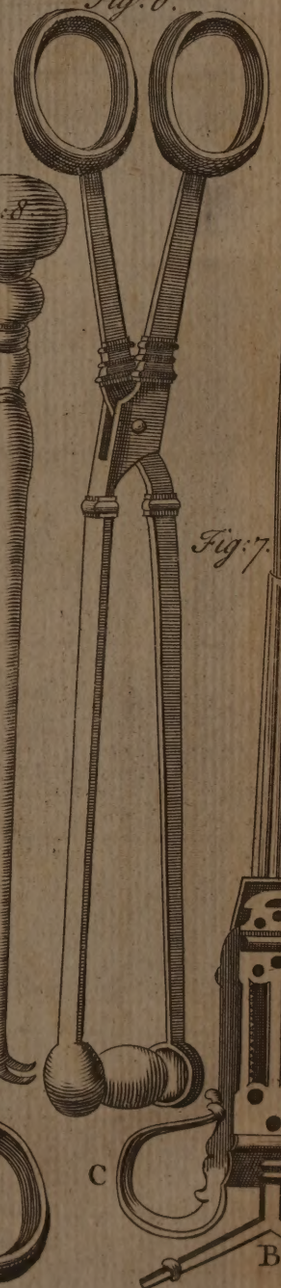

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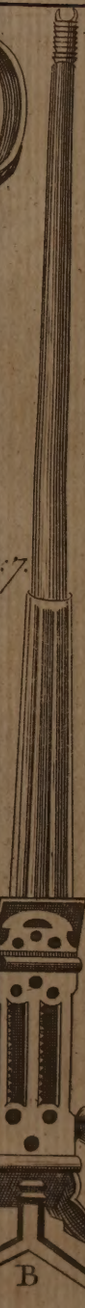

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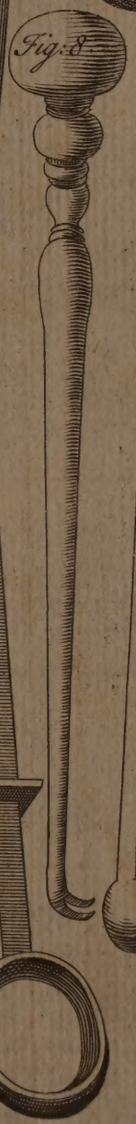

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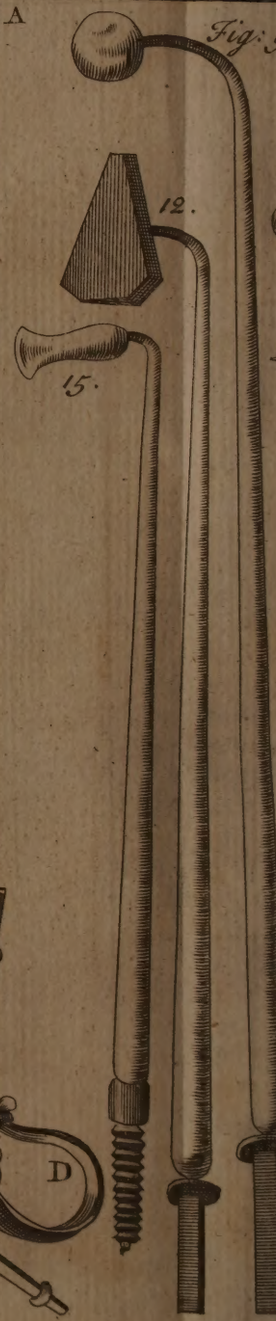


Fig: 10.

B, The *Belt* or Napkin, which is to ſurround the Body in Wounds of the Thorax or Abdomen, to bind the Applications to the Part affected.

C, The *Scapulary*, to ſupport the Belt.

D, The Method of making the Ligature after Bleeding in the Arm.

E, The Manner of tying up the Foot after Bleeding, which, from the Similitude it has with a *Stirrup*, is called by that Name.

F, Shews the ſpiral Manner in which the Bandage ought to aſcend, when it is applied to the Leg or Arm; which is ſometimes called *the expelling Bandage*.

G, A ſerpentile Bandage, where the Convolutions are not ſo frequent.

H, A large Wound in the Thigh, which requires the true or bloody Suture.

K, The Part where the *Tournequet* is to be applied to the Arm, and the Manner of applying it.

L, The Manner of applying it to the upper Part of the Thigh; the Bandage which is rolled up, and applied as a Bolſter lyes upon the crural Artery at M.

N, Shews how the *Tournequet* is to be applied to the lower Part of the Thigh, in which Caſe the rolled Bandage is to be applied to the back Part of the Thigh.

O, A large Wound of the Abdomen, with the Inteſtines falling out.

Fig. 2. The common *Tournequet*, before it is applied.

Fig. 3. Crooked Forceps furniſhed with Teeth at the End, called the *Crane's Beak*.

Fig. 4. A pair of ſtrait Forceps.

Fig. 5. The *Duck's Bill* Forceps, furniſhing with a moveable Ring at the lower End.

Fig. 6. The *Gooſe Bill* Forceps.

Fig. 7. The Inſtrument invented by BARTHOLOMÆUS MAGGIUS to extract Bullets that are fixed in a bony Part.

Fig. 8. A Hook to extract Bullets.

Fig. 9, 10, 11, 12, 13, 14, 15, 16. Different Sorts of Cauteries.

Fig. 17. Shews in ſome Meaſure the Manner of performing the Operation called *Gaſtroraphy*, or the Suture of the Abdomen. The Letters *a a* deſcribe the Wound; *b b*, two crooked Needles with the Threads hanging to them; *c c c c*, two Threads drawn through the Lips of the Wound, and cleared from their Needles.

CHAP. VI.

Of WOUNDS *of the* INTESTINES, *and the Manner of ſtiching them up.*

I. WHEN a large Wound is made in the Cavity of the Abdomen, that not only lets out the Inteſtines, but alſo divides ſome Part of them, (*See Chap.* V, *N.* IV.) the Surgeon ought always to ſtich up the wounded Parts of the Inteſtines, before he returns them By this Means we may not only expect the Wound to heal more readily, but the Diſcharge of Chyle and Fæces into the Cavity of the Abdomen, which would bring on great Miſchief, is prevented. And although Wounds of the Inteſtines, eſpecially of the ſmall Guts, admit of little or no Hopes of a Cure; yet as the great Guts, as CELSUS obſerves,

When the Suture of the Inteſtines is to be performed.

obſerves, *Lib.* VII, *Chap.* 16. ſometimes admit of the Suture to advantage, it is better to uſe a doubtful Remedy than none: Therefore the Surgeon ſhould never neglect examining whether the Inteſtines are injured, that he may uſe all probable Means of healing them. *See above Chap.* V, *N.* IV, V.

When the Suture is not to be attempted.

II. Small Wounds of the Inteſtines, that do not exceed in Size the Diameter of a Gooſe Quill, ſhould by no Means be ſtiched, but are beſt left to Nature. If they are left to themſelves, they will frequently unite much ſooner than if they are irritated by the Suture: For Stiching uſually brings on great Pain, Inflammation, and other bad Symptoms. Therefore it will be much better to return them inſtantly, (*See Chap.* V, *N.* V.) and to bleed the Patient to prevent Inflammation, adviſing him to Reſt and Abſtinence. For it is better by Induſtry and Care to cheriſh even ſmall and glimmering Hopes, than through Fear and Negligence to give the Patient over.

How the Opening is to be performed.

III. But large Wounds of the Inteſtines, though they ſeldom admit of Cure, are to be ſtitched up with *the Glover's Suture*, before the Inteſtine is returned: To perform this you ſhould be provided with a fine Needle threaded with Silk. An Aſſiſtant ſhould take hold of one Part of the Gut, with a fine Piece of Linen well aired before the Fire; whilſt the Surgeon ſhould hold the other Part in his Left-hand, and ſew up the whole Wound after the Glover's Manner, leaving very ſmall Spaces between each Stich; to wit, little more than a Mathematical Line. The laſt Stich ſhould be faſtened with a Knot, but the other End ſhould hang about a Foot out of the Abdomen, by which the Silk may be drawn out when the Inteſtine is healed, *See Plate* IV, *Fig.* 20. Some in this Caſe prefer the *interrupted Suture*, becauſe it is performed with fewer Punctures, and therefore is not liable to bring on ſo great Inflammation; though the Threads, which are very ſmall, ſhould be left behind. GARENGEOT propoſes another Method of performing *the Glover's Suture*, *in Operat. Chirurg. Artic. de Gaſtroraphia.* But to ſay Truth, Experience ſhews us, that very few are ſaved, whatever Suture is made uſe of.

What is to be done afterwards.

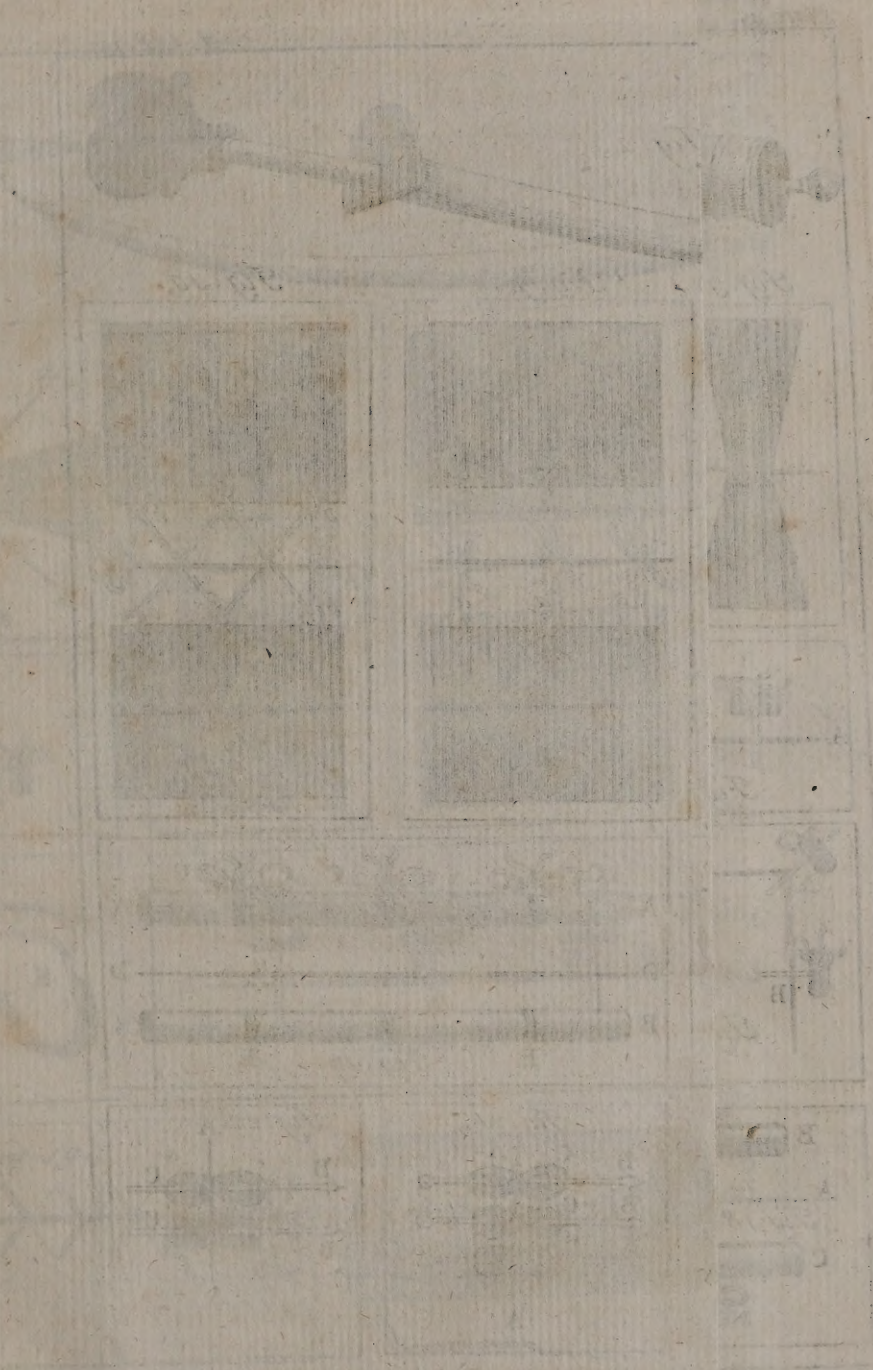
IV. After this Operation is performed, the Wound of the Abdomen is next to be taken Care of, and ſtiched up, as we have ſhewn in the former Chapter upon that Subject, always obſerving the Caution I there laid down, which I cannot inculcate too frequently, of keeping the depending Part of the Wound open with a Tent, till all the præternatural Fluids are diſcharged from the Cavity of the Abdomen, and until the Union of the Wound in the Inteſtine ſhall render it proper to draw out the Silk with which it was ſtiched up.

How the Wound is to be dreſſed.

V. There is no Neceſſity for explaining to you the Method of cleaning, dreſſing, and healing the Wound. We have already ſpoken ſufficiently on that Subject in *Chap.* V, *N.* XIV. and the following Numbers. Only I would furniſh the Surgeon with this farther Caution, that where two Threads hang down from the Belly, one belonging to the End of the Tent, the other to the Suture of the Inteſtine, it will be proper to diſtinguiſh them by different Colours, to prevent miſchievous Miſtakes.

An eaſier Method of healing Wounds of the Inteſtines.

VI. As the modern Surgeons have found by Experience, that ſcarce any are ſaved who have received Wounds in the Inteſtines, and that in thoſe few who do recover, the wounded Parts, from the Fineneſs of the Coats of the Gut, do not properly unite, but rather adhere to the inner Part of the *Peritonæum*, or to the *Omentum*, or to ſome of the other Inteſtines; it is no wonder, therefore, that they



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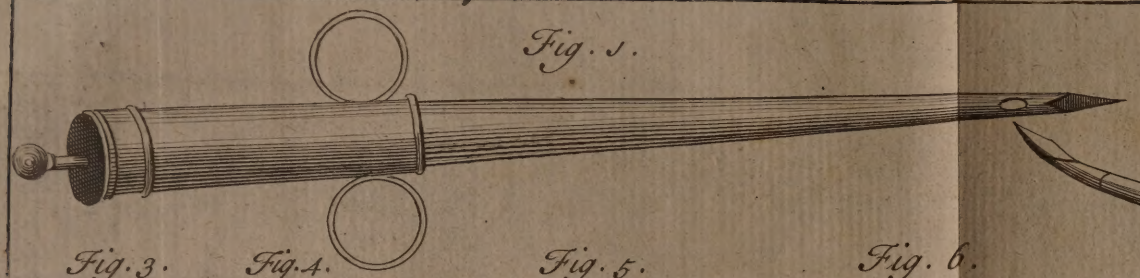

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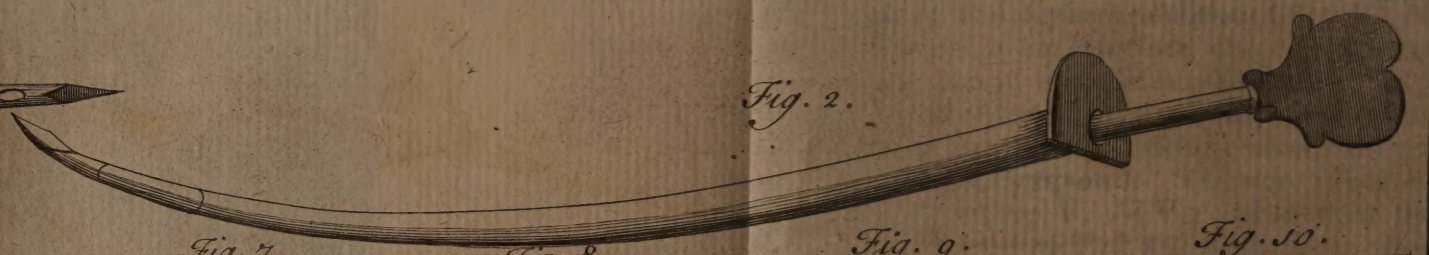

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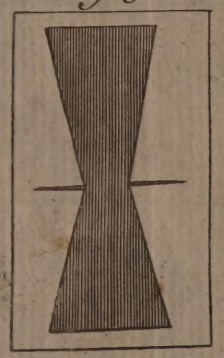


Fig. 4.

Fig. 5.

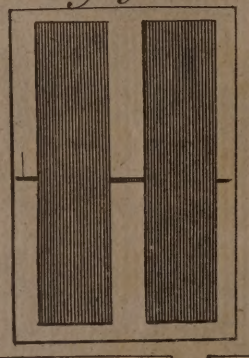
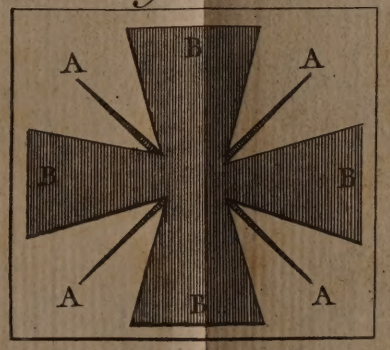


Fig. 6.



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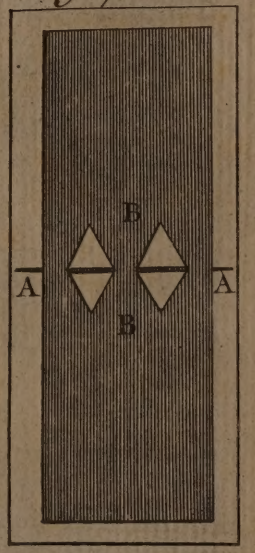
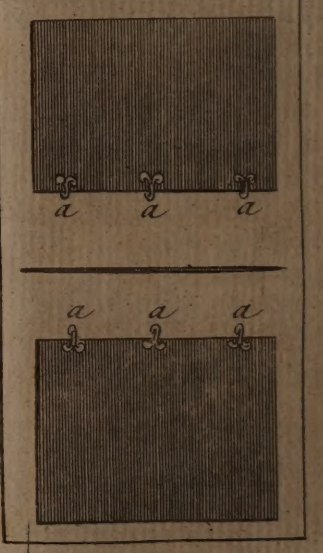


Fig. 8.

Fig. 9.



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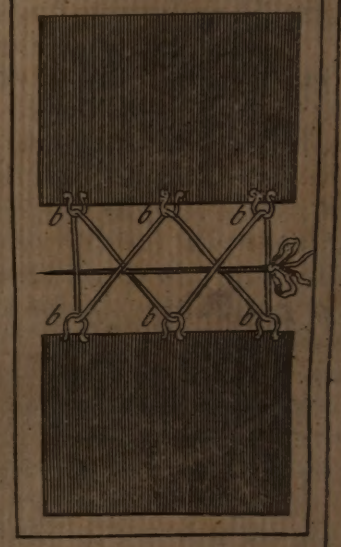

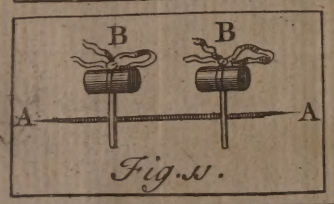

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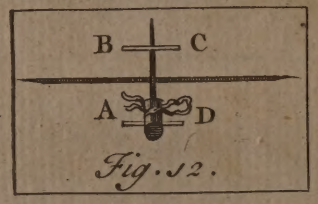

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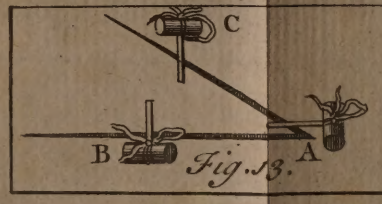

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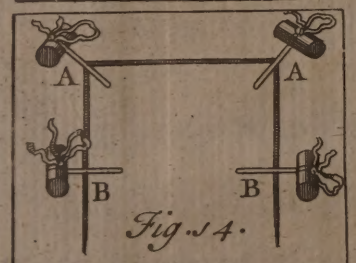

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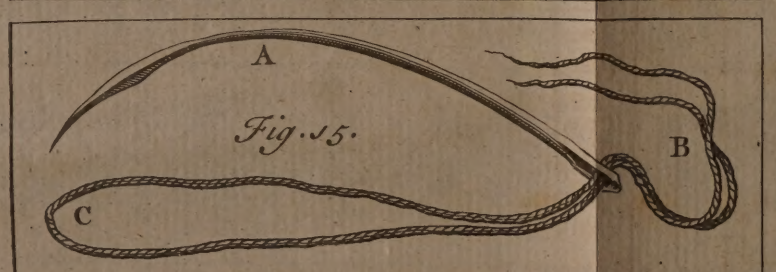

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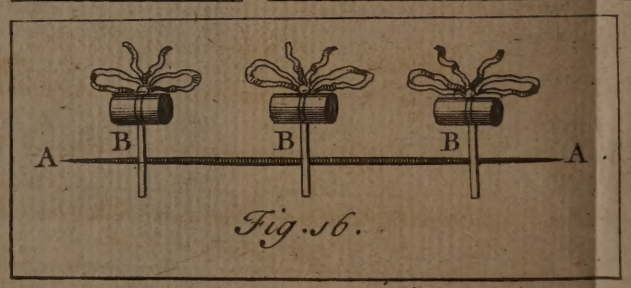

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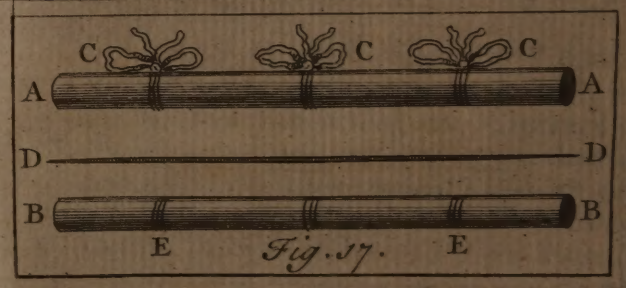
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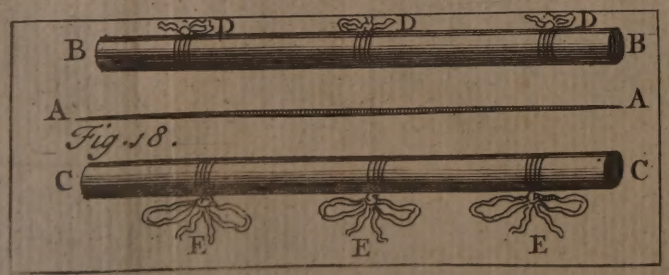

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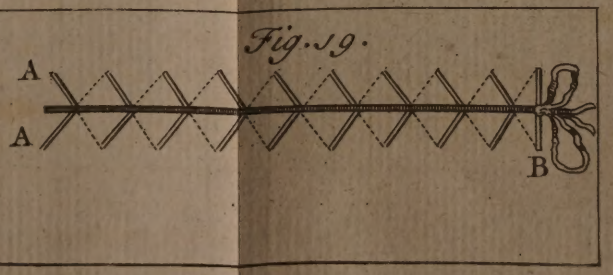
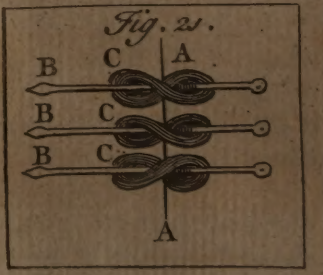


Fig. 19.

Fig. 20.



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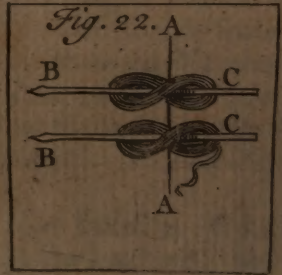

Fig. 22.

intirely lay aside the Practice of stiching up the wounded Parts of the Intestine, especially with uninterrupted Stiches, like the *Glover's Suture:* which by the frequency of the Puncture brings on a violent Inflammation, the most acute Pains, Convulsions, nay, sometimes Cancer or Mortification, and Death itself. But they rather chuse now to deal more tenderly with the Patient, and to substitute a gentler Method of Cure. In Consequence of which, the present Practice is to pass a waxed Thread through a fine Needle, and with this to fasten the wounded Part of the Intestine to the internal Orifice of the Wound of the Abdomen. The Thread that hangs out of the Abdomen is to be so firmly fixed by the Application of sticking Plasters to the Wound, that the Intestine cannot recede from the Part to which it was fastened, nor can it evacuate any of its Contents into the Cavity of the Abdomen. When this Operation is well performed, the Intestine easily adheres to the internal Part of the Abdomen, and the Patient suffers infinitely less Pain and Hazard, than from the former Method of making the Sutures. The same Regulations in Diet, and the same Methods of Dressing, and the bleeding the Patient, which we advised above at *Chap.* V, *N.* XIV. *and the following Numbers*, are to be observed. The same Method of Cure will also serve for Wounds of the Stomach, where they are within the reach of the Hand, and it is sometimes crowned with Success. *See* Bohnii *lib. De renunciatione Vulnerum*, *Sect.* II. *Chap.* V.

Explanation *of the* Fourth Plate.

Fig. 1. Petit's *triangular Needle*, for making a new Aperture in the Part opposite to the Wound, which the *French* call *Contre-ouverture.*

Fig. 2. My Improvement upon Petit's *Needle*, which will take place where a strait Needle cannot safely be used, *See Book* I, *Chap.* I, *N.* XXXVII.

Fig. 3. AA, represents a Wound, the Lips of which are to be united by the Sticking Plaster indented on both Sides at BB.

Fig. 4. Shews a Wound to which two Sticking Plasters are applied.

Fig. 5. A Wound of the like Nature, to which are applied two Sticking Plasters without Indentations.

Fig. 6. A Wound made cross-ways, AAAA, united by two Plasters laid cross-ways, BBBB.

Fig. 7. A Wound AA, to which a Sticking Plaster is applied, with two Openings in the Middle, BB.

Fig. 8. A Wound united by the Application of two Plasters, with Tapes fixed to each of them, which are drawn together and fastened with slip Knots, *aaa.*

Fig. 9. The same Wound with Plasters of the same kind, furnished with Hooks, *aaa*, instead of Tapes, by which, with the Assistance of Threads tied to them, the Lips of the Wound are drawn together.

Fig. 10. Another Method of doing the same Thing, used by the Antients.

Fig. 11. A Transverse Wound, AA, united by the *Interrupted Suture*, BB.

Fig. 12. Shews in what Manner a cross Wound is to be stiched up, and the Lips of it brought together by drawing the Threads tight, ABCD.

Fig. 13. Where the Stiches are to be made in a Triangular Wound, ABC.

Fig. 14. How a Wound with two Angles is to be stiched with the *interrupted Suture*, first at the Angles, AA, and then, if it is necessary, on each Side at the Letters, BB.

Fig. 15. *A large crooked Needle, for ſticking large Wounds, with a double Thread,* to make the *quilled Suture.* A is the Needle; B the double Thread; C the Bow-end of the Thread.

Fig. 16. A large Tranſverſe Wound, A A, united by a Triple *Interrupted Suture*, B B B.

Fig. 17. The ſame kind of Wound, D D, which beſides the Threads at *Fig.* 16. is furniſhed alſo with ſmall cylindrical Rolls of Silk ſpread with ſome Wax or Plaſter, A A and B B: the Threads on the upper Lip of the Wound are tied in ſlip Knots, C C C, whilſt the Roll that lies on the under Lip is confined between the Bow-ends of the Threads, E E E. In a word, this ſhews Palfynus's Method of making the *quilled Suture.*

Fig. 18. Shews you another Method of making the *quilled Suture* in large tranſverſe Wounds, particularly in thoſe of the Belly, which is called *Gaſtroraphy*, *See Book* I, *Chap.* V, *N.* XLVII; *and Chap.* V, *N.* XVIII. A A, the Wound. B B, the upper Roll. C C, the lower Roll. D D D, the ſingle Knots which confine the Lace, compoſed of ſix or eight Threads, and the upper Roll. E E E, the ſlip Knots which ſecure the lower Roll.

Fig. 19. Celsus's *Suture*, which he deſcribes at *Lib.* VII, *Chap.* XVI, for performing the Operation of *Gaſtroraphy* with two Needles. But this is a bad Method, and out of Practice. A A, the Stiches. B B, the End where they are faſtened in a Knot.

Fig. 20. The *Glover's Suture*, uſed for uniting Wounds of the Inteſtines. A A, the Inteſtine. B B, the Wound. C, the beginning of the Suture, with part of the Thread hanging out. D, the End of the Suture, where it is faſtened in a Knot.

Fig. 21, 22. *The Suture for the Hare Lip*, which is made with two or three Needles. A A, the deſcending Wound. B B, Needles paſſed through the Lips of the Wound. C C C, the Thread twiſted round the Needles.

CHAP. VII.

Of Loss of Substance *in the* Intestines.

What is to be done when there is a Loſs of Subſtance.

I. WHERE any Part of the Inteſtine is carried away, the Caſe ſeems to be plainly deſperate. It was therefore wonderful that Perſons thus wounded did not all die upon the Spot, or in the Operation of making the Sutures: till [a] Heldanus, [b] Blegny, [c] Dionys, [d] Palfynus, [e] Jo. M. Hoffman, [f] Schacher, [g] Vater, [h] Cheselden, Heister, and others, obſerved, that the Lips of Inteſtines ſo wounded, would ſometimes quite unexpectedly adhere to the Wound in the Abdomen; and therefore there ſeemed to be no Reaſon why we ſhould not take this [i] Hint from Nature. Whenever therefore a Surgeon is called

[a] Obſerv. 74. Cent. I. Obſ. 72. Cent. VI. [b] Zodiac. Med. Gall. An. 2. pag. 123. [c] In Chirurg. cap. de Gaſtroraphia. [d] In Chirurg. cap. de Gaſtroraph. [e] Diſq. Corp. Hum. Anat. Path. [f] In Diſſert. de Morb. ex ſitu Inteſtin. [g] In Diſſertat. de Vuln. in Inteſtin. lethal. [h] Lib. de alto apparatu.

[i] A Surgeon tried this firſt with Succeſs upon a Dog. *See* Blegn *Zodiac. Gall. An.* 2. p. 143. afterwards it was performed upon a Man. *See Miſcell. Natur. Curioſ. Dec.* 2. *An.* 8. *Obſ.* 229.

to

to a Case of this Kind, after he has deligently examined the State of the Upper Part of the Intestine, which has suffered a Loss of Substance, he should stich it to the external Wound, either by the continued or interrupted Suture. For by this Means the Patient may not only be saved from instant Death, but there have been Instances where the wounded Intestine has been so far healed, that the Fæces which used to be voided *per Anum*, have been voided by the Wound in the Abdomen: Which, from the Necessity of wearing a Tin or Silver Pipe, or keeping Cloths constantly upon the Part to receive the Excrement, may seem to be very troublesome: But it is surely far better to part with one of the Conveniencies of Life, than to part with Life itself. Besides, the Excrements that are voided by this Passage, are not altogether so offensive, as those that are voided *per Anum*.

II. The same Method of Cure may conveniently enough be put in Practice, where any Part of the Intestine is mortified by being forced out of the Abdomen. For in this Case, if you tie up the mesenteric Arteries, the corrupted or mortified Part of the Intestine may be cut off, and the remaining sound Part made to adhere to the Wound of the Abdomen. For it is better to try this Method, though but few should be saved by it, than to suffer all to perish, as Celsus observes; It is wiser to attempt a doubtful Remedy, than absolutely to despair. I once published a Cure of this Kind in a Dissertation containing various Observations, printed at *Helmstadt*. How a mortify'd Gut is to be treated.

III. When the Intestines are wounded, but not let out of the Abdomen, and therefore their Wounds are out of Reach, the Surgeon can do nothing but keep a Tent in the external Wound, according to the Method of Dressing laid down at *Chap.* V, *N.* XIV. and after this, bleed the Patient, if his Strength will admit of it, advising him to rest, to live abstemiously, and to lie upon his Belly. The rest is to be left to Divine Providence, and the Strength of his Constitution. But the Question may be asked here, Whether a Surgeon may not very prudently, in this Case, enlarge the Wound of the Abdomen, that he may be able to discover the injured Intestine, and treat it in a proper Manner? Truly I can see no Objection to this Practice, especially if we consider, that upon the Neglect of it, certain Death will follow; and that we are encouraged to make Trial of it by the Success of others. Shacherus, *in Programmate Publico, Lipsiæ edit.* 1720, mentions a Surgeon who performed this Operation successfully. So Cheselden of *London* gives us an History where in the *Hernia incarcerata* he laid open the Abdomen, returned the Intestines, and perfectly cured his Patient. *See his Treatise on the High Operation*, pag. 180. *and his Anatomy*, 3d edit. pag. 283. How concealed Wounds of the Intestines are to be treated.

IV. But what Assistance are we likely to receive from Clysters in Wounds of the Intestines? Some Physicians are very high in their Commendation, whilst others, of equal Credit, absolutely prohibit the Use of them. For my own Part, I see no Reason for carrying either Prejudice to so great a Length. The Use of Clysters is very prudently forbid in Wounds of the great Guts, but no less Judgment is shewn in prescribing them in Wounds of the small ones. In the first Case, the Clyster will make its Way through the Wound, into the Cavity of the Abdomen, to the great Detriment of the Patient; whereas in the latter, they will always prove beneficial. For the Inconvenience which attends the other, is prevented in this Case by the Valve of the *Colon*; and the Benefits that accrue from Of Clysters in this Case.

this Application are very obvious: The uſeleſs Fæces are carried off, an equable Courſe of the Blood is reſtored, the Fever and Inflammation are much abated by it, if not entirely taken off, and the Pains greatly aſſuaged.

CHAP. VIII.

Of the FALLING DOWN *of the* OMENTUM.

Falling down of the *Omentum.*

I. IN large Wounds of the Abdomen, the *Omentum* will frequently protrude itſelf through the Wound, either alone or with ſome Portion of the Inteſtines. Whenever this is the Caſe, the Surgeon's firſt Inquiry is, Whether the protruded Part preſerves its Heat, Moiſture, and natural Colour? If it is not found faulty in any of theſe Circumſtances, it muſt be gently returned: But where the Straitneſs of the Wound forbids this, the protruded Part muſt be taken off cloſe to the Wound, and the Wound healed according to the common Form. The *Omentum* in this Caſe will adhere to the internal Part of the Wound, without bringing any Diſorder upon the Patient. But where the Inteſtines fall out at the ſame time, the *Omentum* is to be fomented, by an Aſſiſtant, with warm Milk and Water, till the Inteſtines are returned, and then the *Omentum* muſt be replaced.

What is to be done when the *Omentum* is corrupted.

II. If any Part of the protruded *Omentum* is cold, dry, livid, mortified, or putrid, the diſcoloured corrupted Part muſt be entirely cut off before the reſt is returned; leſt the neighbouring Parts ſhould be brought into conſent, which would inevitably prove fatal to the Patient. GARENGEOT would have the vitiated *Omentum* returned wholly into the Abdomen, without Ligature or Inciſion. But that this Procedure is wrong, I ſhall ſhew more fully in the following Numbers.

How the corrupted Part is to be taken off.

III. The corrupted Part of the *Omentum* may be taken off in this Manner: Take a ſtrong waxed Thread, paſs it two or three Times round the ſound Part of the *Omentum*, near the Place where it is injured, and faſten it with a Knot, to prevent any Hæmorrhage enſuing after the Reduction of it. When you have made a ſecure Ligature, take off the corrupted Part with the Knife or Sciſſors; and return gently what remains ſound, leaving at leaſt the length of a Foot of the Ligature hanging out of the Wound in the Abdomen, till it ſlips off from the ſound Part of the *Omentum*.

How the Wound is to be dreſſed.

IV. What remains with regard to the Cure of the Wound is ſufficiently treated of above at *Chap.* V, *N.* XIV. *and the following Numbers.* The depending Part of the Wound ſhould be kept open with a large Tent, ſuch an one as is deſcribed *Plate* II, *Lett.* O, that a Paſſage may be left for an Evacuation of the Sordes from the Cavity of the Abdomen. It will be proper to give two different Colours to the Thread that hangs from the Tent, and that which belongs to the Ligature of the *Omentum*, to prevent Confuſion, as we adviſed above, *Chap.* VI, *N.* V.

How the Thread is to be drawn out.

V. At every Dreſſing, after the firſt ſix or ſeven Days, you may draw the Thread which hangs out of the Abdomen gently forwards, till it ſhall by Degrees ſlip quite off the *Omentum*. But this ſhould be done without any Violence. When the Thread is drawn out, and you can perceive no Diſcharge from the Cavity of the Abdomen, you may remove the Tent, and uſe proper Means to heal

heal the external Wound. After which you ſhould take away ſome Blood, unleſs there has been a ſufficient Diſcharge before; and recommend Reſt and Abſtinence to the Patient.

VI. What ſhall we ſay to the unwarranted Opinion of DIONIS? who adviſes Surgeons never to take off any Part of the *Omentum*, but rather to follow the Example of MARESCHALL, *firſt Surgeon to the French King*, who, according to our Author's Account, has very frequently returned the *Omentum* without making either Ligature or Inciſion, and never ſaw any bad Conſequence from this Practice. But I will venture to pronounce this Relation of DIONIS's to be very faulty, and not delivered with that Accuracy which is required in a Matter of Fact of this Conſequence. We cannot learn, by this Account of his, whether the *Omenta*, which were returned in this Manner by MARESCHALL, were large or ſmall, whether they were entirely ſound, or corrupted in part. If they had received no Injury, DIONIS ſpends his Time idly, when he ſo earneſtly entreats all Surgeons to follow the Steps of MARESCHALL in this Point: No body ever adviſed the contrary. But if they were in part corrupted or mortified, which DIONIS does not aſſert, it is much to be admired that the Patients felt no Inconvenience from this Practice; and what became of the corrupted Parts after they were returned, is to me Matter of great Wonder. Therefore DIONIS is by no means to be attended to upon this Point, till he ſpeaks to it in a clearer Manner: And more particularly ſo, becauſe PALFYNUS gives us the Hiſtory of a Caſe, in his Surgery, where MARESCHALL made a Ligature and Inciſion upon the *Omentum*, and ſeparated the corrupted Part from the ſound, before he returned it: And this he declares to be the Practice of Surgeons of the firſt Name in PARIS. DIONIS's Advice in this Caſe.

VII. GARENGEOT declares himſelf of the ſame Sentiments with DIONIS, though he makes no Mention of his Name. This Author is far from being clear in deſcribing how large a Portion of the *Omentum* was affected, which MARESCHALL, or any other, returned, without Injury to the Patient. I do not deny but that a very ſmall Portion of the *Omentum* may be digeſted in the Abdomen without bringing on any conſiderable Miſchief: But I can by no Means be perſuaded that this can ever be the Caſe, when a large Portion of the *Omentum* is affected, except I ſhould be confronted with many Inſtances of it. If by chance one Inſtance ſhould be produced, this will not put the Matter out of doubt, much leſs ſerve as an Example worthy of Imitation. For miraculous Events happen now and then in very dangerous Wounds: And ſince grievous Symptoms are brought on by letting Sordes remain even in external Wounds, what may we not fear from the ſame Incident in internal Wounds, from whence they cannot poſſibly be diſcharged? A large Degree of Suppuration is to be expected when a large Portion of corrupted *Omentum* is returned into the Body: But when a Ligature is made upon the *Omentum*, and the corrupted Part ſeparated from the ſound, no ſuch Accident can happen. The Suppuration in this Caſe will be very inconſiderable, and the ſmall Quantity of Matter that is made after Reduction, will be eaſily diſcharged through the external Wound that is kept open for that Purpoſe by a Tent: Whereas GARENGEOT forbids the Uſe of Tents promiſcuouſly (which this very MARESCHALL uſed with great Succeſs) and adviſes you to heal the Wound as ſoon as poſſible. I am of opinion, therefore, that you ſhould very carefully diſtinguiſh between a great and ſmall Degree of Suppuration, becauſe this is of greater Conſequence than GARENGEOT ſeems GARENGEOT's Advice.

ſeems to imagine. Since this Matter is left doubtful, and GARENGEOT no where pretends to have had Experience of the good Effects of the Practice which he eſpouſes; but on the other hand, PALFYNUS, who was an Eye-witneſs, contradicts him; I think we may very ſafely imitate the Examples of many excellent Surgeons, in making a Ligature upon the *Omentum*, and ſeparating the corrupted Parts of it from the Sound, before we attempt to return it into the Abdomen.

CHAP. IX.

Of WOUNDS *of other Parts of the* ABDOMEN.

IF you can diſcover by your Eye, or by the Touch, that any other Part or *Viſcus* ſituated in the Abdomen, ſuppoſe the Liver, Spleen, or Kidney, has received a Wound from a ſharp Inſtrument, it will be adviſeable at the firſt Dreſſing, to fill the Wound as tenderly as poſſible, with a good Quantity of Lint, well ſaturated with high rectified Spirit of Wine, or Spirit of Turpentine, ſecuring the Dreſſings with Compreſſes and Bandage: By this Means the Hæmorrhage will be ſtopped, if no large Blood-veſſel is divided. But you muſt obſerve that the Lint be not removed at the firſt Dreſſings; it ſhould remain till it drops off of itſelf. When you have gained this Point, the Wound may be treated according to the Rules we laid down for the Treatment of Wounds of the Abdomen. The reſt muſt be left to God's Providence, and the Strength of the Patient's Conſtitution. During the Cure the Patient muſt be conſtantly kept ſtill and low. If he is of a plethoric Habit of Body it will be proper to bleed him, to prevent Inflammation, and freſh Effuſions of Blood; preſcribing him alſo vulnerary Potions, and giving him daily two or three Doſes of *Lucatellus's* or *Meibomius's Balſam:* For theſe Balſams are of great Efficacy in healing internal Wounds. In hidden Wounds of the Viſcera, that are not to be diſcovered by the Eye or by Feeling, all you can do is to take proper Care of the external Wounds, daily injecting a vulnerary Decoction, and keeping open a free Paſſage for the Evacuation of grumous Blood and Matter from within, ordering the ſame Regimen to be obſerved both with regard to Medicine and Diet, which we adviſed above, and leaving the reſt to Nature, for Art can give no further Aſſiſtance.

EXPLANATION *of the* FIFTH PLATE.

Fig. 1. Deſcribes a blunt Iron Needle, to paſs a fine Rag or Skein of Silk, well ſaturated with proper Balſams or Ointments, through *Gun-ſhot*, or other *pervious Wounds*, after the Manner of a *Seton*.

Fig. 2. An Inſtrument to ſtop the Blood in Wounds of the large Arteries, deſcribed in *Ch.* II. § VIII. from our Amendment.

AA, A Braſs Plate ſomewhat bent.

BB, A ſtrong Braſs Screw.

C, A round Plate of a Thumb's Breadth to be fixed upon the Wound.

D, The

Fig. 1.

Fig. 2.

Fig. 4.

Fig. 5.

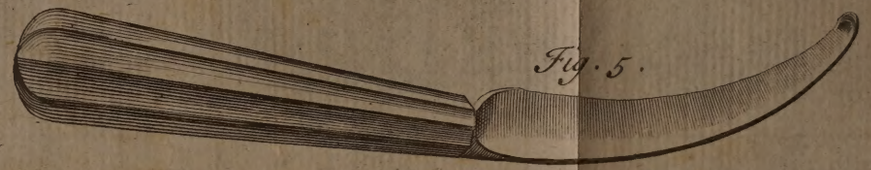

Fig. 6.

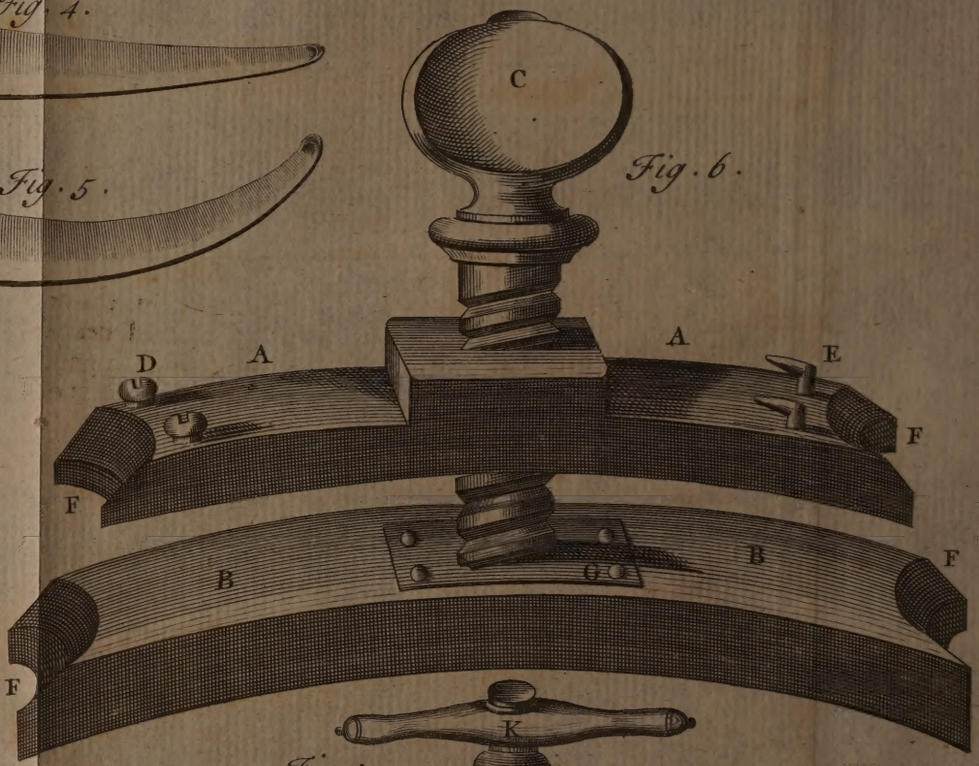

Fig. 3.

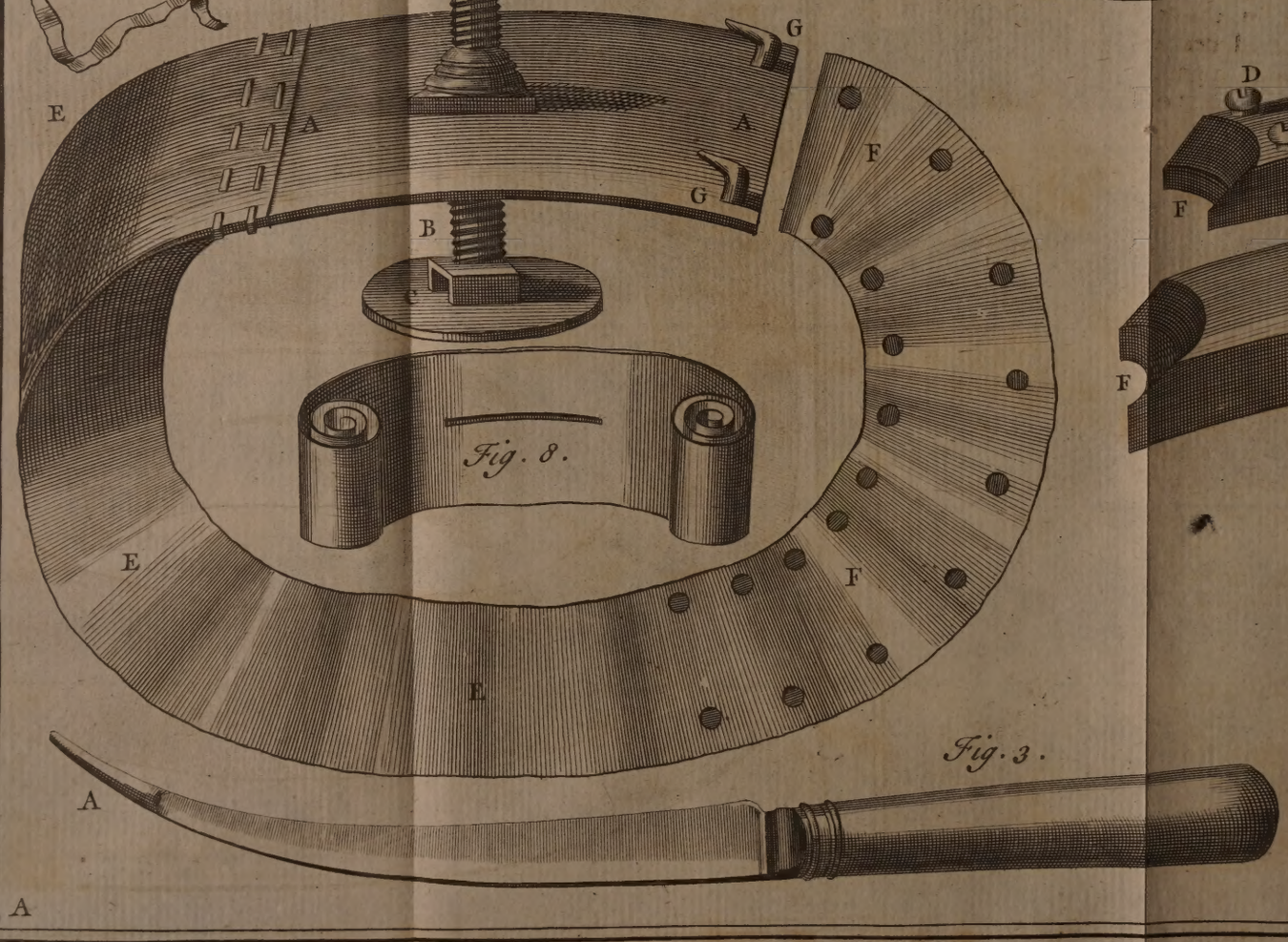

Fig. 8.

Fig. 7.

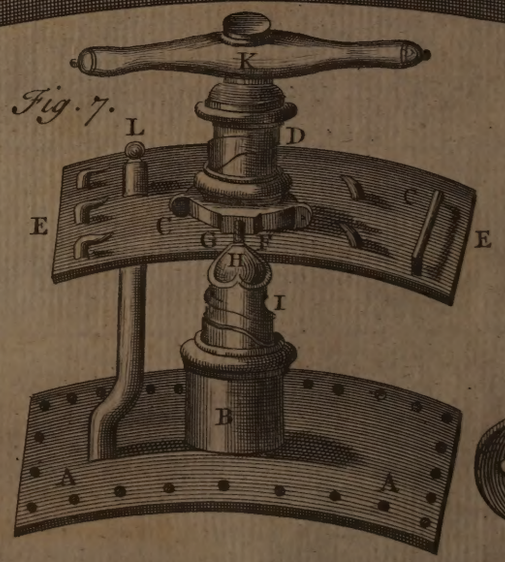

Fig. 9.

D. The Button which turns the Screw, and preſſes the Plate C ſtrongly upon the Wound.

E E, A ſtrong Leather Belt to ſurround the wounded Part.

F F, Part of the Belt pierced with ſeveral Holes, by which it may be fixed upon the Hooks G G, and lengthened or ſhortened according to the Size of the Limb.

Fig. 3. A crooked Knife, with a round blunt Point, to enlarge Wounds of the Thorax or Abdomen, where that Operation is required.

Fig. 4. A ſtrait Knife with a Button on the Point.

Fig. 5. A crooked Knife with a blunt Point.

Fig. 6. A wooden *Tournequet* in its proper Size, to ſtop Effuſions of Blood, after our Amendment deſcribed above at *Chap.* II, § XII.

A A, The upper Part.

B B, The lower Part.

C, The great Screw.

D, Two ſmall Iron Screws, to which a Leather or Silk Belt is to be fixed.

E, Hooks to faſten the other End of the Belt on, when it is brought round the Limb.

F F, The Ends of the upper and lower Part of the Inſtrument hollowed to receive the Belt, and to keep it ſteddy in its Situation.

Fig. 7. Another kind of *Tournequet* made of Iron; the Deſcription is leſs by half than the proper Size of the Inſtrument. *See Chap.* II, § XIV. where it is largely treated of.

Fig. 8. A broad Bandage, called the *uniting Bandage*; this is perforated in the Middle, and rolls up with two Heads; it is uſed in dreſſing Wounds of the Abdomen, which are made lengthways.

Fig. 9. A flexible Silver Pipe, uſeful to diſcharge the Matter which is collected in Wounds of the Thorax, or in the Empyema.

A, The Openings at the Extremities, and on both Sides.

B B, The Plate round it, with two Holes to paſs a Thread through.

C, The Paſſage that goes through the Pipe to A.

CHAP. X.

Of WOUNDS *of the* THORAX.

I. WOUNDS of the *Thorax*, as of the Abdomen, are divided into three ſorts. The Wound is inflicted either upon the external Parts of the *Thorax* only; or elſe it penetrates into the Cavity of the *Thorax*, without injuring any of its Contents; or laſtly, the Contents of the *Thorax* alſo partake of the Wound. Wounds of the Breaſt of three Sorts.

II. You may diſcover that the Wound terminates in the external Parts, and does not penetrate into the Cavity of the *Thorax*, by ſeveral Methods. 1. By the Sight. 2. By the Senſe of Hearing, by which you will diſcover whether any Sound proceeds from the Wound at the Time of Inſpiration. 3. By Feeling, when How to diſcover whether the Wound is terminated in the external Parts.

when your Finger or the Probe meets with Reſiſtance, if you attempt to paſs it into the Cavity of the *Thorax*. 4. By injecting warm Water, which in this Caſe will return ſtrongly upon you. 5. By the Abſence of bad Symptoms, ſuch as Difficulty of Breathing, Fainting, ſick Fits, *&c.* which always attend a Wound that penetrates. When by theſe Methods of examining you are fully ſatisfied that the Wound does not penetrate, you may dreſs it with a digeſtive Ointment, or ſome vulnerary Balſam, and treat it according to the Methods which we have adviſed above for the Cure of ſlight Wounds.

What deep and oblique external Wounds of the *Thorax* occaſion.

III. It ſometimes happens that external Wounds run very deep and obliquely between the Muſcles and the Ribs, and are thereby rendered very difficult to be cleanſed from grumous Blood and Matter. The confined Matter in this Caſe frequently deſtroys the neighbouring Parts, and produces Ulcers and incurable Fiſtulæ: Nay, ſometimes it makes its Way through the *Pleura* into the Cavity of the *Thorax*, and forms an *Empyema*, or brings on a *Phthiſis*, or Death itſelf.

How they are to be treated.

IV. The Surgeon's chief Buſineſs in this Caſe is to clear the Sinuſes from the Blood and Matter confined in them. This is to be done either by Preſſure, or by ordering the Wound to be ſucked by an healthy Perſon; by drawing it out with a Syphon, or by making further Openings with the Knife. The reſt of the Cure is to be performed after the ſame Manner which we deſcribed above, *N.* II. The moſt proper Bandage for ſecuring the Dreſſings is the ſcapulary with the Girdle. *See Plate* III, *Fig.* 1. Which Bandage muſt be eaſy, that the Blood, or Matter, confined in the Wound, may have the freer Vent.

How to empty the Wound with a Syringe.

V. The *Syringes* that are uſed in this Caſe are of very different Shapes and Sizes; ſome are ſtrait, others crooked. Some Surgeons uſe a Tin Syringe, reſembling that which we have deſcribed at *Plate* VI, *Fig.* 8. but twice as large: The Mouth of it is larger than the reſt of the Syringe, and is of a triangular, round, or oval Figure. *Fig.* 9. repreſents the true Size of it. When you apply this Inſtrument, you muſt clap the Mouth of it to the Wound, and by drawing back the Handle, endeavour to fill it with Blood. The Inſtrument ſhould have ſeveral Heads of different Sizes and Figures, that it may correſpond with any ſort of Wound. But, concerning the Excellency and Uſe of theſe Syringes, it will be worth your while to conſult ANELLE, in his Treatiſe called *l'Art de Succer les Playes.*

How to diſcover if the Wound penetrates the Cavity.

VI. You will diſcover the Wound to penetrate into the Cavity of the *Thorax*; 1. By the Sight, when you can plainly ſee into the Cavity. 2. By the Senſe of Feeling, when you can paſs your Fingers or Probe into the Cavity. 3. By the Hearing, if the Patient makes a particular ſort of Noiſe in drawing his Breath. 4. From the Action of the Air of the Lungs upon the Flame of a Candle, or Feathers, when they are held near the Mouth of the Wound. 5. By warm Water meeting with no Reſiſtance, when it is injected into the Wound. 6. Laſtly, from the ſudden Appearance of violent Symptoms, ſuch as Difficulty of Breathing, Sickneſs, Fainting, *&c.* which are brought on by the Preſſure which the Lungs are ſenſible of from the external Air, from a Collection of Blood in the *Thorax*, or from both Cauſes together.

VII. When

VII. When a large Quantity of Blood is ſpilt, and falls into the Cavity of the *Thorax* (which muſt ſometimes be the Caſe) the Expanſion of the Lungs, the Office of Reſpiration, and the Courſe of the Blood through the Lungs will certainly be impeded; and the Blood by frequent Delays and Obſtructions being entirely inſpiſſated in the Lungs, Life can no longer be ſupported. But where the Quantity of extravaſated Blood is not large enough to obſtruct the Lungs in their Office, the chief Danger that the Patient labours under is, that the extravaſated Blood ſhould putrify by Degrees, and corrupt the Diaphragm, Pleura, or Lungs; which will bring on very bad Symptoms, and in a ſhort Time Death. What proceeds from a Collection of Blood in the *Thorax*.

VIII. The following Symptoms diſcover an Extravaſation of Blood in the *Thorax*. If, 1. There is a great Difficulty of Breathing, except when the Patient is placed in an erect Poſture. 2. If the Patient lies eaſieſt upon his Back or wounded Side, but finds any other Poſture exceeding troubleſome, or ſometimes impracticable. 3. If he feels a Weight upon the Diaphragm. 4. If he perceives the Undulation of a Fluid upon turning the Body round. And, 5. laſtly, If there has been little or no Diſcharge of Blood from the Wound. Symptoms of extravaſated Blood in the *Thorax*.

IX. When it appears by theſe Symptoms that there is a Collection of Blood in the *Thorax*, we muſt uſe our utmoſt Diligence to get it out, leſt it ſhould lay a Foundation for great Miſchief. Therefore, 1. When the Wound is inflicted upon the Middle, or lower Part of the *Thorax*, and has not a very narrow Opening, it will be convenient to lay the Patient upon the [a] wounded Side, adviſing him to fetch his Breath as deep as he can, or to cough. If the current of Blood is obſtructed by any thick grumous Parts, which will ſometimes ſtop up the Orifice of the Wound, they muſt be removed with your Finger, or with the Probe, or drawn out with a Syringe, or by Suction. 2. If you are called ſo late that the Blood is become too thick to flow out of the Wound, you will be obliged to uſe an attenuating Injection; which may be made of a Decoction of Barley, with the Addition of ſome common Honey, or Honey of Roſes, and a ſmall Quantity of Soap; this is to be injected, not over-warm, into the Cavity of the *Thorax*, and then the Patient is to be ſo ſituated as to let it run out again. This Operation is to be repeated till it appears that all the grumous Blood is waſhed away. The Syringe, which you will ſee deſcribed in *Plate* VI, *Fig.* 8. with the Pipes, *Fig.* 10, 11. will execute this Intention very properly. 3. But if the Wound is ſo narrow or oblique that this Method cannot be proſecuted, it ſhould be enlarged, either with the common Inciſion Knife and Director, or with one of the Knives deſcribed at *Plate* V, *Fig.* 3, 4, 5. This Caution is always to be obſerved, that is, to be very careful not to fatigue the Patient too much, by endeavouring to diſcharge all the extravaſated Blood at one Time. If the Patient is very weak, it is better to do it at proper Intervals, eſpecially if you diſcover any Tendency in him to Swoonings. It will be neceſſary in the mean Time to keep the Wound open by the introducing a Leaden or Silver Pipe into the Wound, ſuch as are deſcribed at *Plate* II, *Lett.* Q, R, S, or rather that flexible one at *Plate* V, *Fig.* 9. Though ſome, inſtead of a Pipe uſe a Tent with a long String at the End of it, dreſſing up with pro- How to get the Blood out of the *Thorax*.

[a] DIONIS, in his *Surgery*, relates a Caſe of this Kind, where he left his Patient all Night inclined upon the Wound without dreſſing him, and he afterwards recovered him. DE LA MOTTE confirms this by an Inſtance he gives us of the ſame Kind, that occurred to him in his Practice. *See his Obſervationes Chirurgicæ.*

per Plaſters and Compreſſes, ſecuring the whole with the Scapulary, repeating this Method of dreſſing till the Diſcharge ſhall entirely ceaſe, and the external Wound can be conveniently healed.

How the Blood is to be diſcharged when the Wound is in the upper Part of the *Thorax*.

X. When a Wound is made in the upper Part of the Breaſt, or between the upper Ribs, then the Method we have preſcribed of turning the Patient upon the wounded Side, will be of very little Service in diſcharging the extravaſated Blood; for no Poſture will ſatisfy this Intention in this Caſe but ſtanding upon the Head. In this Caſe, if no Relief is to be expected from the Syringe or from Suction, an Opening ſhould be made in the lower Part of the *Thorax*, which Operation the Surgeons call the *Paracenteſis*. The Opening muſt be between the ſecond and third Rib, counting upwards, if it is on the Left Side; but on the Right Side, between the third and fourth, about a Hand's Breadth from the Spine. The Place where you intend to make the Opening ſhould be marked with Ink. The Inſtrument that is generally uſed upon this Occaſion is called a *Trocar*: It ſhould be driven above the Rib into the *Thorax*, with great Caution and Gentleneſs. After it has penetrated, draw out the Steel Inſtrument, leaving in the Pipe through which it was conveyed, as a Channel for the Blood to paſs off by: But if it does not readily paſs, its Evacuation may be forwarded by Suction, or a Syringe. But as the Lungs are very liable to be wounded by paſſing this Inſtrument forcibly into the Cavity of the *Thorax*, it is beſt, in my Opinion, to divide the common Integuments, the Intercoſtal Muſcles and Pleura, with an Inciſion Knife, carefully avoiding the Lungs, which are very apt to adhere to the Pleura in this Part. When the Perforation is properly made, it is to be kept open in the Manner we have already ſhewn, and the Wound above is to be healed as ſoon as poſſible.

What is to be done when the Lungs adhere.

XI. As the Lungs frequently adhere to the Pleura, the Perforation of the *Thorax* requires great Circumſpection in the Surgeon. The Pleura ſhould be divided with all poſſible Tenderneſs; and when that is done, the Surgeon ſhould examine whether the Adheſion of the Lungs may not ſafely be removed with his Fingers or the Probe. When the Adheſion is very firm, the Pains we have taken to proforate the *Thorax*, and to diſcharge the extravaſated Blood, all prove fruitleſs. We muſt in this Caſe make an Inciſion in another Part, either before, or on one Side; and proceed as above.

How Wounds of this kind are to be treated.

XII. The Cavity of the *Thorax* being thus cleanſed, the Wound is to be dreſſed but once every Day: Each Dreſſing ſhould be performed with all poſſible Expedition, and the utmoſt Diligence ſhould be uſed to guard the Contents of the *Thorax* from the external Air. At the Time of dreſſing, a Chafing-diſh of hot Coals ſhould be held near the Wound to warm and thin the Air; and if too great a Quantity of Air is already got into the Cavity of the *Thorax*, it muſt be drawn out with a Syphon. This being rightly performed, the Wound is to be dreſſed up with the utmoſt Expedition.

If any of the Contents of the *Thorax* are wounded.

XIII. When any of the Contents of the *Thorax* are wounded, as the Heart, the Aorta, the Vena Cava, the Pulmonary Artery or Vein, the Œſophagus, Thoracic Duct, the Mediaſtinum, or a large Portion of the Lungs (eſpecially if it is a Gun-ſhot Wound) Death comes too ſuddenly to give the Surgeon Room to exerciſe his Art. On the other hand, when the Lungs are only ſlightly wounded, that is, when only the ſmaller Ramifications of the Pulmonary Vein or Artery, or the Aſpera Arteria are divided, the Caſe is very dangerous, but

but not always mortal. Though Perſons who recover after Wounds of this Kind, are more obliged to the Soundneſs of their own Conſtitutions, than to their Surgeon's Skill.

XIV. We may reaſonably apprehend that the Lungs are wounded, when the Patient voids a great Quantity of frothy Blood by the Mouth, accompanied with a Cough, eſpecially when at the ſame Time the Blood which is voided at the Wound is very florid, and the Patient makes a particular Noiſe when he draws his Breath. The Office of the Surgeon here ſeems to be to clear the internal Part of the *Thorax* from the extravaſated Blood, and to heal the external Wound: The Methods of doing which, we have already explained. No Application can be made to the internal Wound: That muſt be left to Nature. Whenever the divided Veſſels contract themſelves, and the Blood ſtops of itſelf, the Patient will recover: Though Perſons who have recovered from theſe Wounds are remarkably ſubject to Ulcers of the Lungs and Conſumptions. Whenever any of the larger Pulmonary Veſſels are divided, the Violence of the Hæmorrhage either brings preſent Death with it; or, if it ceaſes a little, it returns again, and comes to the ſame End by ſlower Paces. To prevent this as much as poſſible, it will be proper to keep the Patient quite ſtill for ſeveral Days, he ſhould ſcarce ſpeak, he ſhould take cooling and agglutinating Medicines, and avoid all ſharp Things, all that heat the Blood, or provoke Coughing; and, if his Strength will permit it, he ſhould loſe Blood by the Arm. Signs of a Wound in the Lungs.

XV. Sometimes the wounded Part of the Lungs puſhes forward, and ſticks pretty firmly in the Orifice of the external Wound, as FONTANUS, TULPIUS, and RUYSCH have obſerved in their Writings. In this Caſe, if it is forced back again, it will diſcharge a great Quantity of Blood into the Cavity of the *Thorax:* Therefore it is better to let it remain in the Situation you ſhall find it, for by this Means it will admit of the immediate Application of proper Dreſſings, and you may ſafely encourage it to adhere to the Lips of the external Wound. And here the Patient muſt be ſtrictly admoniſhed to keep as ſtill as poſſible. But if a[a] wounded Portion of the Lungs ſhould be puſhed out of the *Thorax* beyond the Limits of the external Wound, you ſhould wrap a Piece of fine Linen round this Part, and make a Ligature above the Linen, taking off all that is below the Ligature with the Knife, and returning the ſound Part of the Lungs into the Body, keeping one End of the Ligature conſtantly hanging out at the external Wound. When you have proceeded in this Manner, keep the Wound open with a Tent, till the Ligature can ſafely be drawn out. How the external Wounds ſhould be treated we have ſufficiently explained already. Of the puſhing out of the Lungs.

XVI. As to the Medicines which are to be preſcribed for internal Uſe, they conſiſt chiefly, after the Hæmorrhage is over, of vulnerary Decoctions, giving at due Diſtances of Time a Doſe of *Balſamum Lucatelli, vel Meibomii*, obſerving particularly a ſtrict Regulation with regard to Diet. By following theſe Rules a Surgeon may ſometimes ſave a Patient that has received a Wound of this Kind, at leaſt, where it was impoſſible to perform a Cure, he will have the Satisfaction of having done his Duty. What Internals are to be given.

[a] HILDANUS, *Cent.* II. *Obſ.* 3. relates a Caſe of this Kind, where a Portion of the Lungs forced its Way through a Wound of the *Thorax*; and Part of it appearing black and corrupted, he took it off with a red hot Knife, and then forced the ſound Part back again into the Body. The Patient, he tells you, ſurvived this, and recovered a perfect State of Health.

EXPLANATION *of the* SIXTH PLATE.

Fig. 1. A Braſs *Tournequet* after PETIT's Manner, but with ſome Alterations: The Uſe of this Inſtrument, and Method of applying it, will eaſily appear, if you compare it with what we have ſaid above in *Chap.* II. *Of Wounds.* § XV. and afterwards in the *Explanation of the fourth Plate, Fig.* 2, *and* 6.

Fig. 2. A Handle to fix Needles in when you are to make Sutures: This the *French* call *Portaiguille.*

Fig. 3. Another of the ſame Sort from GARENGEOT.

Fig. 4. PETIT's Handle for Needles.

Fig. 5. A Needle to perform *Gaſtroraphy.*

Fig. 6. Another of a larger Size.

Fig. 7. Another, which is new, to perform the ſame Operation.

Fig. 8. A Syringe for various Uſes, furniſhed with Pipes of different Sorts; by the Help of this you may not only inject Fluids into Wounds of the Abdomen and Thorax, into the Fauces, into Abſceſſes, Ulcers, and into the Uterus; but you may alſo by the Aſſiſtance of this Inſtrument draw extravaſated Blood from the Cavity of the *Thorax*, in which Caſe the Syringe ſhould be twice as large; the Mouth of the Pipe A ſhould be triangular, and about two Thumbs Breadth.

Fig. 9. Another Pipe with a round Mouth, intended for the ſame Uſes.

Fig. 10. A ſmaller Pipe, which may be faſtened to the Syringe, *Fig.* 8. for various Uſes.

Fig. 11. Another ſomewhat curved, and perforated on both Sides: This will ſerve to ſuck Blood out of the Cavity of the Thorax, and to throw Injections into that Part, or into the Fauces.

Fig. 12. Another, perforated at the End like a Cullender.

Fig. 13. Another like the former, but curved, to throw Injections into the Uterus, and for other Uſes.

Fig. 14. An Iron Inſtrument like an Ear-picker, for various Uſes.

CHAP. XI.

Of WOUNDS *of the* NECK.

Wounds of the Neck of bad Conſequence.

I. WOUNDS of the Neck are no leſs dangerous than thoſe of the Thorax or Abdomen; inſomuch, that I am ſurprized to find ſeveral Chirurgical Writers treat of Wounds of this Claſs ſlightly, as if they were ſcarce worthy of their Notice. And I have often wondered, and complained of it in my Anatomy, (Sect. 264.) that in the Diviſion of the Trunk the Neck ſhould be omitted.

How many Kinds of Wounds of the Neck.

II. There are ſeveral Sorts of Wounds in the Neck. Sometimes the Seat of the Wound is only in the common Integuments, and the muſcular Fleſh: This is attended with very little Danger: But the moſt dangerous, and indeed generally incurable Wounds, are thoſe of the larger Blood-veſſels in theſe Parts: Such are thoſe of the jugular Veins, carotid and vertebral Arteries; or where the Aſpera Arteria is wounded; or the Gula; the Medulla Spinalis; the Nerves

that

Plate 6.

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Fig: 1.

Fig: 7.

Fig: 4.

Fig: 2.

Fig: 8.

Fig: 13.

Fig: 14.

Fig: 9.

Fig: 12.

Fig: 11.

Fig: 10.

Fig: 6.

Fig: 3.

Fig: 5.

that deſcend by the Neck; (ſuch as the Par Vagum, the Intercoſtales, and the Diaphragmatici) or where ſeveral of theſe Parts are wounded at the ſame Time.

Diagnoſis and Prognoſis.

III. You will eaſily diſcover with your Eye, or by conſidering the Situation of the Wound, and the Symptoms that attend it, what Parts of the Neck are the Subjects of the Wound. After this Diagnoſtic, the Prognoſtic of thoſe Wounds will eaſily follow. For whoever is thoroughly acquainted with the Condition of a Wound, will find no great Difficulty in determining the Event of it. Where the common Integuments and Muſcles alone are wounded, you will have no reaſon to dread any very ill Conſequences. But where any of the other Parts of the Neck are Partakers of the Injury, you have reaſon to apprehend the greateſt Danger; becauſe moſt of thoſe Parts are abſolutely neceſſary to Life itſelf: Though in this Caſe, where the Wound is ſmall, there are ſome Hopes of a Cure.

What happens after Wounds of the Arteries in the Neck.

IV. Wounds of the Arteries in the Neck are ſcarce ever to be remedied, unleſs the Wound be very ſmall indeed; for in this Caſe the Patient uſually bleeds to Death before a Surgeon can be called to his Aſſiſtance: Though to ſay Truth, if a Surgeon were preſent at the Inſtant ſuch a Wound was inflicted, all his Art and Induſtry would have little or no Effect: For it is extremely difficult to ſtop Blood in this Part, not only from the Largeneſs of the Arteries here ſituated, and from their Vicinity to the Heart; but becauſe it is impoſſible in this Place to make a ſufficient Preſſure upon the wounded Veſſel. Yet the Wounds of the external carotid Arteries, and the Hæmorrhages they occaſion, are more eaſily managed; eſpecially if an experienced Surgeon be applied to in Time.

After Wounds of the Veins.

V. A Wound upon the external Jugular Vein is not attended with much Danger, if a Surgeon is called in Time; for a ſmall Degree of Preſſure is required here, as appears by the frequent Practice of Blood-letting in this Part. But Wounds of the internal Jugulars are extremely dangerous; and this partly from their Size, which is uſually larger than one of the Fingers; partly becauſe their Situation is ſo deep, that no proper Application can reach them to any Advantage. For theſe Reaſons many Surgeons have determined Wounds of this Kind to be mortal; but I can by no Means admit this as an abſolute Rule, without any Exceptions. On the contrary, I am of Opinion, that where the Wound in the internal Jugular is made by a ſharp Inſtrument, and but ſmall, if a Surgeon is ready at hand, the Patient may be ſaved. How this is to be effected I ſhall teach below.

Wounds of the Aſpera Arteria.

VI. Wounds of the *Aſpera Arteria* were uſually deemed mortal by Chirurgical [a] Writers: I am ſo far from contradicting them in this Sentence, that I ſhall rather endeavour to ſupport it, that is, where the Wind-pipe is entirely divided, or wounded in its lower Part within the Cavity of the [b] Thorax, or joined with a Wound of the carotid Arteries or internal Jugulars, which is frequently the Caſe. But on the other hand, if it is only wounded in the fore Part, and the neighbouring Veſſels remain unhurt, it is undoubtedly curable; which Opinion is ſtrongly ſupported by variety of Examples from my own Experience, and that of other Practitioners. See above *Ch.* I. *N.* XIX.

Wounds of the Oeſophagus.

VII. There are very little Hopes of Recovery where the Gula is much wounded, or entirely divided; becauſe not only the Office of Deglutition is cut

[a] See BOHNIUS *de Vuln. Lethal.* Cap. ii. p. 23.
[b] Ibid. Sect. II. Cap. iii. pag. 121.

off,

off, but the Part is ſo ſituated, that it is almoſt impoſſible to wound it without injuring at the ſame Time ſome of the neighbouring Nerves and Blood-veſſels. But when the Gula is the only Subject of the Wound, and the Opening is very ſmall, the Wound may ſometimes admit of a Cure.

Wounds in the Medulla Spinalis and Nerves.

VIII. Wounds on any Part of the *Medulla Spinalis* are very dangerous, but more particularly ſo when inflicted upon that Part of it which paſſes through the Neck. Therefore it is no Wonder that ſcarce any one recovers after a conſiderable Wound of this Kind. The Reaſon of this will immediately appear, when we conſider, that ſeveral Nerves proceed from this Part, which are abſolutely neceſſary to conduct the Œconomy of the Animal; that the vertebral Veins and Arteries will almoſt always be wounded at the ſame Time; and that the Situation of theſe Parts is ſuch, that it is impoſſible to convey the proper Remedies to them. Nor are Wounds of the large Nerves of the Neck, ſuch as we mentioned at *N.* II. leſs dangerous than theſe: For if they are divided, the nobler Parts of the Thorax or Abdomen, to which Nature hath determined them, will immediately loſe their Aſſiſtance, and of Conſequence become unequal to the Offices for which they were intended.

How ſlight Wounds of the Neck are to be treated

IX. The Treatment of Wounds in the Neck is different, according to the different Nature of the Wound. When the common Integuments and muſcular Fleſh are the ſole Subjects of the Wound, it will require the ſame Method of Treatment which we have adviſed above for all ſlight Wounds, upon what Part ſoever they may be inflicted. Where the external Jugular is wounded, the ſame Methods which we uſe after bleeding in that Vein will be ſufficient.

Cure of a Wound in the Internal Jugular.

X. When the internal Jugular Vein has received a ſmall Wound, the Hæmorrhage will eaſily be ſtopped by filling the Wound well with dry Lint, or ſteeped in *Alcohol. Vini*, or *Spirit. Terebinth.* or any proper ſtyptic Medicine; or with the Fungus called *Crepitus Lupi*; laying over theſe Applications ſquare Bolſters, and ſecuring all with a Bandage, drawn as tight as the Situation of the Part will admit. An Hæmorrhage is much eaſier ſuppreſſed in a Vein than in an Artery: The whole of the Cure depends upon the Degree of Preſſure that you can make upon the wounded Veſſels. Sometimes it happens that the Method of dreſſing which we have juſt adviſed in this Caſe will have no Effect: When this ſhall happen, the Surgeon or his Aſſiſtant muſt keep his Finger conſtantly upon the Wound, or make a Preſſure upon the Part, with ſuch an Inſtrument as we deſcribed in *Plate* V, *Fig.* 2. till the Hæmorrhage is entirely ſtopped. This Preſſure ſhould uſually be continued for a Day or two. The ſame Proceſs ſhould alſo be obſerved in Wounds of the vertebral Veins and Arteries. After the Blood is ſtopped, the Dreſſings ſhould continue upon the Part untouched till the third Day, and then a vulnerary Balſam and Plaſter may be applied to heal the Wound.

How a large Wound of the Internal Jugular is to be treated.

XI. When the internal Jugular Vein has received a large Wound, or is entirely divided, the Patient will preſently die with the Loſs of Blood. But if a Surgeon ſhould be preſent when ſuch a Wound is received, or ſhould come in inſtantly afterwards, I would adviſe him to make a Preſſure upon the divided Vein with his Finger, and to enlarge the Wound upwards and lengthways, till he can come at enough of the Veſſel to make a ſtrong Ligature upon it by the Aſſiſtance of a crooked Needle, ſuch as I have deſcribed, *Plate* VIII, *Fig.* 4; and then he may fill up the Wound, and treat it as at *N.* X. By this Means

the

the Life of the Patient may be ſaved, though the Courſe of the Blood through this Veſſel be entirely cut off. I have often tried this Experiment upon a Dog, and he has recovered, and never ſuffered any apparent Inconvenience from it. Therefore I think it better to put this doubtful Remedy in Execution, than to leave the Caſe as deſperate.

How a Wound in the carotid Artery is to be treated.

XII. A Wound in the carotid Artery is attended with greater Danger than a Wound in the internal Jugular: But if a Surgeon is preſent when the Wound is received, I think he ſhould make the ſame Attempts to cure it. This is more likely to meet with Succeſs in Wounds of the upper and middle Part of it, than in Wounds of the lower Part. But where the Wound is not in the Trunk of the Artery, but in one of its Branches near the Head, you ſhould fill up the Wound with Lint, dipped in ſome ſtyptic Liquor, if you have it ready; then cover it up with thick Compreſſes, ſecuring all with a tight Bandage, and ordering an Aſſiſtant to make a Preſſure upon the Part for ſome time with his Hand. *See Part* III. *Ch.* II. *N.* VIII. *and Plate* 37. *Fig.* 8. By theſe Methods I have very ſucceſsfully ſtopped violent Hæmorrhages, that have proceeded from wounded Branches of the carotid Artery, which I have divided in taking out large ſchirrous, parotid, or ſubmaxillary Glands. In theſe Caſes you ſhould never remove the Dreſſings till the third or fourth Day. Nor ſhould the Lint, applied at the firſt Dreſſing, be forced out; but remain in the Wound, till it works its own Way. Otherwiſe a freſh Hæmorrhage, and that very violent, moſt commonly enſues (I ſpeak from Experience) by which the Patient's Life may be greatly endangered.

How to treat Wounds of the Aſpera Arteria.

XIII. In curing Wounds of the *Aſpera Arteria*, the Surgeon ought, after cleanſing the Wound, to endeavour to unite the divided Parts by the Aſſiſtance of ſticking Plaſters; or, where the Wound is large, by making two Stiches with a crooked Needle, dreſſing them up afterwards with ſome vulnerary Balſam, a ſticking Plaſter, and proper Compreſſes, adviſing the Patient to keep his Head in a prone Situation. [a] The Wound thus treated will eaſily heal, if it is made either by Puncture or by a cutting Inſtrument. But if any Part of the the *Aſpera Arteria* is carried away by a Bullet, the Suture is to no Purpoſe: Wounds of this Kind are more readily healed and filled up by the Uſe of a digeſtive Ointment, or vulnerary Balſam. But this muſt be particularly remembered, that the Head be kept in a prone Situation. If the *Aſpera Arteria* is entirely divided, and the lower Part of it contracts itſelf into the Cavity of the Thorax, ſo that it cannot be laid hold on, and united to the upper Part, the Patient muſt undoubtedly die. If the Artery is not entirely divided, the Surgeon muſt raiſe the lower Part, and unite it to the upper by Suture [b].

How to treat Wounds of the Oeſophagus.

XIV. Where the *Œſophagus* is wounded, whatever the Patient attempts to eat or drink paſſes through the Wound, and he is uſually attended with Hiccoughs and Vomiting. Where the *Œſophagus* is entirely divided, there is no Poſſibility of curing it; but where it is only perforated or wounded in part, you may attempt the Cure by dreſſing the Wound with a vulnerary Balſam, by endeavouring to unite it with ſticking Plaſters, and by adviſing the Patient

[a] Cures of this Kind are to met be with in BARTHOLIN, *in Hiſt. Anatomic. Cent.* V. *Hiſt.* 89. and in TULPIUS, *Obſ.* Lib. i. Cap. 50. and in other Writers; many of whom GARENGEOT has quoted, Tom. ii. C. de Bronchotom.

[b] A remarkable Inſtance of this is related by GARENGEOT, *Op. Chir.* Tom. ii. C. de Bronchotom.

to

to a ſtrict Abſtinence for ſome Days, or at leaſt to take Nouriſhment by the Mouth very ſparingly, at the ſame Time preſcribing nouriſhing Clyſters of Broths or Milk. But when the Neceſſities of Nature require Nouriſhment to be taken by the Mouth, the Wound ſhould conſtantly be diligently cleaned afterwards, leſt any Part of what was taken ſhould ſtick by the Way and putrify, which would bring on very bad Symptoms [c]. After the Wound is cleaned in this Manner, it is to be dreſſed daily with ſome vulnerary Balſam till it heals. But if the *Œſophagus* be wounded within the Thorax, the Situation is ſuch that Art cannot reach it: The Cure muſt be left entirely to Nature.

How Wounds of the Medulla Spinalis are to be treated.

XV. Wounds of the *Medulla Spinalis* are beſt dreſſed with the *Balſamum Peruvianum*, *Eſſentia Myrrhæ aut Succini*, *Spiritus Maſtichis*, or with Medicines of the like Nature, mixed with a ſmall Quantity of *Mel Roſarum* ſpread upon Pledgits, and applied moderately warm; and then covered with a vulnerary Plaſter. The Event muſt be left to God's Providence, and the Strength of the Patient's Conſtitution. Slight Wounds of theſe Parts ſometimes heal by this Method; but large Wounds here bring certain Death.

How to treat wounded Nerves in the Neck.

XVI. Wounds inflicted upon the large Nerves which are ſituated in the Neck, are generally mortal; but where the Wound is very ſmall, the ſame Methods may be attempted which we adviſed in the Wounds of the *Medulla Spinalis*.

CHAP. XII.

Of WOUNDS *of the* HEAD *in general.*

Wounds of the Head very dangerous.

I. NO Wounds are attended with more Danger than thoſe which are inflicted upon the Head; for the ſlighteſt Injury of the Brain will frequently bring on the worſt of Symptoms, and even Death itſelf. Nay, Wounds of the Head which do not penetrate into the Cranium, and proceed only from a ſlight Fall or Stroke, even with a blunt Inſtrument, ſometimes occaſion a Rupture of ſome of the internal Blood-veſſels, and an Extravaſation of Blood in the Brain, which is attended with the moſt miſchievous Conſequences. Therefore even the ſlighteſt Wounds of the Head require all the Care and Caution that we are Maſters of.

Wounds of the Head are of two kinds.

II. We ought carefully to diſtinguiſh, 1. What Parts of the Head are wounded; and, 2. In what Manner the Wound was made; for ſome Wounds of the Head are made with acute Inſtruments, either by ſtabbing or cutting; ſome are made with blunt Inſtruments, which is the Caſe in ſome Blows or Falls, and in Gun-ſhot Wounds. Theſe of the laſt Claſs are attended with much greater Danger than thoſe of the former; for they generally give ſuch a violent Shock, as to burſt the finer Veſſels and Nerves of the Brain.

What Parts are wounded.

III. As to the Parts which are wounded, they are either the common Integuments alone, or with theſe the Fleſh of the Face, or the Pericranium, or the temporal Muſcles, or the Cranium; or ſometimes the internal Parts alſo; next,

[c] The abovementioned Author, in Caſes where the Patient could not ſwallow, recommends the Uſe of nouriſhing Clyſters.

the Dura Mater, Pia Mater, and the Brain, either in its cortical or medullary Part, or in its Ventricles. When the Cranium is wounded, as firſt the inner Lamina of the Cranium, from whence Fragments are often ſplintered, and driven into the Dura Mater or the Brain itſelf; it is either cut, broken, or contuſed. It may not be amiſs to divide Wounds of the Head into two Claſſes; 1. Thoſe that affect the Face. 2. Thoſe that hurt or wound the Cranium, the Caſtle of the Brain, or ſome of its Integuments.

CHAP. XIII.

Of Wounds *of the* Face.

Of Wounds of the Face in general.

I. SINCE the Face was intended for Beauty as well as for particular Uſes, two Things are to be remarked; to wit, That we do not leave worſe Injuries upon the Face, and particularly the Eyes, than we were employed to cure; and that we make an even fair Cicatrix. As the Face conſiſts of various Parts, each of which requires a diſtinct Method of Treatment, it will be neceſſary to treat of each of them ſeparately.

Of Wounds of the Forehead.

II. In almoſt all Wounds of the Forehead that do not penetrate the Scull, this is principally to be obſerved; that after the Wound is cleaned from grumous Blood, and any foreign Bodies that may have got into it, it ſhould be anointed with ſome vulnerary Balſam, ſuch as the *Balſamum Peruvianum*, *Copaivæ*, or any other of that Kind; the Lips of the Wound are then to be kept together with narrow Slips of ſticking Plaſter, and over this a vulnerary Plaſter is to be laid. Where the Wound is large, theſe Plaſters will not be ſufficient to form an even Cicatrix. Therefore to forward this End it will be proper to ſprinkle the Wound with *Pulvis Sarcocollæ*, *vel Pulvis ex Radice Symphyti*, *Gummi Tragacanth. ac Gummi Arabico præparatus:* You may then apply your Plaſter, Compreſſes, and proper Bandages. The bloody Suture is never to be uſed either in theſe or any other Wounds of the Face, where it can be avoided; for the Stiches encreaſe the Number of Scars. If a Wound of the Forehead is made in a ſtrait Line, the *uniting* or *incarning Bandage*, deſcribed in *Plate* II, *Lett. f*, will be of great Service in forming a fine Cicatrix: It is to be applied to the Forehead, after the ſame Manner which we adviſed it to be applied to the Abdomen in longitudinal Wounds of that Part. *See Chap.* V, *N.* X. But if the Forehead is wounded tranſverſely, and the Fibres of the frontal Muſcle are divided, it occaſions a great Deformity; for the Power of lifting up the Eye-brows, and of contracting the Skin of the Forehead, ceaſes. In this Caſe, after cleaning the Wound, it is beſt to unite it with a Stich or two, dreſſing it with a vulnerary Balſam or Powder, and laying on ſticking Plaſters, ſecuring all with a proper Bandage, and adviſing the Patient to keep himſelf ſtill. It ſometimes happens in young healthy Perſons, that the divided Fibres of the Muſcles join and unite without any Suppuration, where this Method of Dreſſing is diligently followed. If any great Degree of Hæmorrhage ſhould enſue upon Wounds of this Part, the firſt Intention is to ſtop it with dry Lint, Compreſſes, and a tight Bandage; and at the next Dreſſing, after it has been well cleaned and waſhed with warm Wine, its

Lips ſhould be brought together as before with Slips of ſticking Plaſter; or in tranſverſe Wounds with a Stich or two, if it be neceſſary.

Of Wounds of the Eye-brows.

III. Wounds of the Eye-brows require much the ſame Treatment with Wounds of the Forehead: Only in Wounds of the Eye-brows more particular Care muſt be taken to guard againſt Inflammation, leſt the Eyes ſhould partake of the Injury. All ſharp Things ſhould be avoided both in Eating and Drinking: And if the Patient is of a plethorick Habit of Body, he ſhould loſe Blood in the Arm. The uſual Dreſſings ſhould be covered with Compreſſes, dipped in camphorated Spirit of Wine. If the Wound is large, and the Eye-brows entirely divided, it will be neceſſary to uſe the Suture, and to dreſs them up with a vulnerary Balſam and Plaſter, covering up both Eyes, and keeping them as much as poſſible from Motion. By neglecting this Method, the Situation of the Eyes in this Caſe will have a very frightful Effect: And ſometimes the Patient is deprived of his Sight.

Of Wounds of the Eye-lids.

IV. Wounds of the upper or lower Eye-lid will not readily heal; not ſo much from the Thinneſs of the Parts of which they are compoſed, as from the Quantity of Fluids with which the Eyes are continually moiſtened. At firſt therefore it will be beſt to foment the Eye *cum Decocto quodam ex Chamomillâ, Hyſſopo, vel Euphraſiâ confecto*, till the Flux of Blood is ſtopped, and the Wound well cleaned. When the Wound is tranſverſe, you may ſtich it up in the Middle with a fine Needle, ſprinkling it afterwards with the Powder deſcribed at *N.* II. or anointing it *cum Balſamo Copaivæ, de Mecchâ*, or with any other of the ſame kind, or with *Oleum Ovorum*, laying over it the *Emplaſtrum Diapalmæ*, and tying it up ſo that the Eyes may have very little Power to move. Where the Wound is lengthways you muſt make ſeveral Stiches, and dreſs it up as before.

Of Wounds of the Eyes.

V. Wounds of the Eye are attended with more Danger than any other incident to the Face; not only as the Patient is thereby often deprived of that moſt precious Bleſſing, the Bleſſing of Sight, (eſpecially if the *Tunica Cornea* or *Uvea* are wounded, either by themſelves, or conjointly together with the neighbouring Parts) but as Death itſelf is ſometimes the Conſequence, if the wounding Inſtrument ſhould pierce the Bones of the Orbit, ſo as to injure the Brain or its Nerves. If the Eye is wounded, but not ſo as to let out the vitreous or cryſtalline Humour, the following Method will be of great Service: The Wound ſhould be anointed two or three Times in a Day with a Feather or fine Rag, well dipped in *Unguentum Alabaſtrinum, aut Albumen Ovi, aut Mucilag. Sem. Cydon. & Pſyllii Aq. Roſar. parat.* and afterwards a ſmall Compreſs is to be laid on, being well ſaturated with the following Collyrium. ℞ *Albumin. Ovor. N.* 2. *Aq. Roſar.* ℥ii ſs. *Ol. Roſar.* ʒ ß. *Camphor. Gr.* iii. *probè conquaſſando.* NUCK gives us a Caſe, where a Man was ſo wounded in the Eye, that part of the vitreous Humour fell out, nevertheleſs he cured him without leaving any Diſorder in his Sight: His Method of Cure was as follows: He divided the Part of the vitreous Humour that hung out of the Eye from the reſt, and then diligently fomented the Eye with a Collyrium, prepared *ex Albumine, Aquâ Roſarum, Lolo Armenâ & Camphorâ probè conquaſſatis. Gumm. Arabic.* ℈i. *in Aquæ Roſar.* ʒ i. *ſolut.* is very ſerviceable in this Caſe; but if it is attended with any great Degree of Inflammation, which is frequently the Caſe, it will be proper to cover the ſmall Compreſs with a larger, dipped in *Spiritu Vino camphorata calido.* The Bowels alſo ſhould be kept looſe for ſome Days with opening and

cooling Medicines; if there is a plethoric Habit, Blood ſhould be drawn from the Neck or Feet; all warm or ſharp Things ſhould be thrown out of the Patient's Diet, and great Care taken to keep him quiet: By obſerving theſe Regulations, not only the Eye, but the Sight of it alſo may be preſerved. When the cryſtalline Humour, or any Part of it ſticks in the Orifice of the Wound, it ſhould be pulled out, that it may not bring on Deformity, or worſe Miſchief upon the Eye.

Where the Humours are fallen out.

VI. When the vitreous and cryſtalline Humours are fallen out of the Eye, not only the Sight, but Figure of the Eye muſt be entirely deſtroyed. Therefore at firſt it ſhould be dreſſed with Compreſſes dipped in warm Wine, or Spirit of Wine, and afterwards with ſome vulnerary Balſam. The Deformity, which the Loſs of Subſtance in the Eye will occaſion, may be avoided by the Help of an artificial Glaſs or Silver Eye. *See Plate* VII, *Fig.* 1. But we ſhall treat more largely of this [a] in another Place.

Sight ſometimes reſtored.

VII. It ſometimes happens when only the *Tunica Albuginea* and *Sclerotica* are ſlightly wounded, the *Cornea* and *Uvea* remaining unhurt, that the Eye recovers itſelf: And though both the vitreous and cryſtalline Humours fall out by the Wound [b], yet they are renewed again by the Benefit of Nature, and the Office of Sight performed as well as before the Injury happened. Dr. SEEGER ſome time ſince was ſo kind as to communicate the Hiſtory of a Caſe of this Sort to me, whence it appeared that he had reſtored Sight to a Woman after ſhe had loſt the Humours of her Eye. When we have duly conſidered this, we ſhall not altogether reject the Teſtimonies of BURRHUS and KERKRINGIUS, when they affirm to us, that they have acquired the Art of reſtoring the Sight after the Humours are entirely fallen out of the Eye. We may now alſo credit thoſe who [c] affirm, that the Sight may be enjoyed without the Aſſiſtance of the cryſtalline Humour, notwithſtanding [d] ſome have ſtrenuouſly maintained the contrary.

Wounds of the Noſe.

VIII. Wounds of the Noſe are generally cured by the dry Suture; but where the Wound divides the Cartilage, and penetrates ſo deep that the Lips of it cannot be kept in contact by the Application of ſticking Plaſters, the true Suture muſt be made through the Skin on each Side of the Wound. Though it ſounds very unlike Truth that any Part of the Noſe ſhould be entirely ſeparated from the reſt, and afterwards united to it again by the Aſſiſtance of Sutures; yet BLEGNY affirms, that this has happened. *See Zodiac. Med. Gall. Edit.* 1680, *pag.* 75. When the naſal Bones are fractured, it is uſual to place ſmall Tubes made of Lead or Silver under them for ſome Time, leſt the Paſſage of the Noſe ſhould be ſtopped by the ſhooting-out of the new Fleſh: You will ſee theſe Tubes deſcribed at *Plate* II, P, Q, R. Externally you may uſe ſome Balſam, or *Eſſentiâ Maſtichis, Succini, vel Myrrhæ*, or ſome glutinous Powder, ſuch as you have ſeen directed at *N.* II. The Lips of the Wound ſhould be kept

[a] Tract. *De Duct. Oculor. Aquoſ.* pag. 126, 127—132.

[b] CREDAT JUDÆUS.

[c] You may find many Inſtances related of Perſons who have enjoyed their Sight after the Loſs of the cryſtalline Humour, in SKENKII *Obſ. Med.* HILDANI *Obſ.* 26. *Cent.* I. *Act. Med. Hafn. Vol.* I. *Obſ.* 69.

[d] See my Treatiſes on the *Cataract, Glaucoma, &c.*

in contact with each other by the Help of ſticking Plaſters, and of a fourheaded Bandage; the Application of which will be explained when we come to treat profeſſedly of Bandages.

Wounds of the Lips.

IX. Wounds of the Lips are made either with ſharp or blunt Inſtruments, or with Bullets: Wounds of the firſt Sort, whether they are made lengthways or tranſverſe, are generally to be cured by the dry Suture: The Patient in this Caſe muſt diligently avoid both Chewing and Talking, his Diet therefore muſt be entirely Spoon-meat; if the Wound is very large, it will require the bloody or true Suture. In Wounds of theſe Parts which are made by blunt Inſtruments, by Falls, or by Bullets, the ſhattered Parts ſhould be brought to Digeſtion, and the Lips of the Wound, after being cleaned, are brought together, either with ſticking Plaſters, or by the Suture, which is uſed for the Hair Lip, which we ſhall deſcribe below.

Wounds of the Cheeks.

X. Wounds of the Cheeks ſhould be treated after the ſame Manner, and with the ſame Circumſpection, which we adviſed for Wounds of the Lips: But if one of STENO's *Salivary Ducts* is wounded in its Paſſage croſs the Cheek from the *parotid* Gland, the conſtant Diſcharge of Saliva into the Wound will prevent the Cure, till the Duct is perforated in the internal Part of the Cheek, to make a Paſſage for the Saliva into the Mouth. This Method of Cure is propoſed by CHESELDEN, in his *Anatomy*.

Wounds of the Ear.

XI. Wounds of the external Ear are eaſily united by ſticking Plaſters, unleſs the Cartilage is entirely divided, and then it will require the Help of the Needle, and the Application of vulnerary Balſams, with proper Compreſſes and Bandages: When the Ear is wounded in the Neighbourhood of the *Meatus Auditorius*, Care muſt be taken to prevent the Diſcharge of Blood and Matter into that Paſſage, which would do great Miſchief to the *Tympanum*; this may be done by filling the internal Ear with Lint or Cotton.

Wounds of the Tongue.

XII. The Tongue is ſo well guarded by the Jaw-bones and the Teeth, that it is very rarely the Subject of a Cut or Stab, but it is frequently bit in Fits of the Epilepſy, in violent Falls, and it is ſometimes wounded by a Bullet. If the Wound of the Tongue is not very large, it will eaſily heal by the Application of *Ol. Amygdal. dulc. cum Sacch. Cand. q. ſ. admiſt. aut Mel Roſar. cum Ol. Myrrhæ per Deliquium.*

How to cure large Wounds of the Tongue.

XIII. Large Wounds of the Tongue will not unite without the Aſſiſtance of the Suture. It is no wonder therefore that Wounds near the Root of the Tongue always leave a Fiſſure in the Part, ſince their Situation prohibits the Uſe of the Needle. To prevent Loſs of Speech enſuing upon large Wounds of the Fore-part of the Tongue, the divided Parts ſhould be brought together with the Needle, as ſoon and as neatly as poſſible, and afterwards anointed with the Medicines which we preſcribed in the laſt Article, ſince ſticking Plaſters will not take Place here. PURMAN affirms, that he made uſe of Silver Threads in Sutures upon this Part to great Advantage. *See his Surgery, P.* I. *Chap.* VI. Gun-ſhot Wounds upon the Tongue are to be dreſſed with the Medicines which we recommended above at *N.* XII; for Sutures are of no Service in this Caſe. The Patient ſhould keep from ſpeaking, and live upon Spoon-meats during the Cure, but more particularly when the Wound is juſt beginning to unite.

Wounds of the Palate.

XIV. Wounds of the Palate will heal beſt if you anoint them with *Mel Roſarum* alone, or with the Additon of a ſmall Quantity of *Balſamum Peruvianum*,

or

or ſometimes *Oleum Myrrhæ per Deliquium.* Theſe Remedies alſo have great Efficacy in curing all other Wounds of the Mouth.

CHAP. XIV.

Of the principal WOUNDS *of the* HEAD.

Intent of this Chapter.

I. WE obſerved above, that Wounds of the *Cranium*, the Seat or Caſtle of the Brain, were to be reckoned under the ſecond Claſs of Wounds in the Head. Theſe, by way eminence, are alone called *Wounds of the Head.* They are divided into ſeveral Diſtinctions, according to the different Parts that are wounded, and the different Species of Wounds. Theſe we ſhall treat of in the Order we enumerated them in *Chap.* XII, at *N.* III. We ſhall begin with the ſlighteſt, which are thoſe Wounds that are inflicted upon the external Coverings of the *Cranium.*

Wounds of the external Parts.

II. There are ſeveral Ways of diſcovering that the Wound is terminated in the external Parts of the *Cranium:* 1. By the Eye. 2. By the Probe, which ſhould be uſed very gently here, for fear of bringing on further Miſchief. 3. By examining the Inſtrument with which the Blow was given, and by conſidering the Degree of Force with which it was impelled. And, 4. Laſtly, by the Abſence of violent Symptoms: For a violent Blow upon the Head will always be attended with Vomitings, Vertigo, Blood will be diſcharged by the Noſe, Ears, and Mouth; and the wounded Perſon will loſe his Speech and Senſes. Theſe Diſorders will appear ſometimes ſooner, ſometimes later; but always more violent, when the Wound is made by a Fall, or by ſome blunt Inſtrument, in which Caſe the *Cranium* is uſually much ſhattered. The Blood which diſcharges itſelf by the Wound, when it is made with a ſharp Inſtrument, will inſinuate itſelf between the common Integuments and the *Cranium.* In Contuſions that are made with blunt Inſtruments ſometimes it will lie concealed under the *Cranium*, and by corrupting the *Perioſteum* and *Cranium* will bring on Ulcers and Caries of the Bone; frequently it will occaſion Fever, Convulſions, and Death. But here it muſt be obſerved, that the Symptoms are far from being certain Indications. For ſome, on receiving a Blow, drop down inſtantly, loſe their Speech and their Senſes; yet recover ſurpriſingly: Others, at firſt, are ſlightly affected, and afterwards die.

Wounds of the temporal Muſcles.

III. When the temporal Muſcles are wounded at the ſame Time, the Patient will be attended with grievous Diſorders; but more eſpecially when this happens by a Blow or a Fall, or by a Bullet: Not only becauſe theſe Muſcles are neceſſary for the Offices of dividing the Food, and for forming the Speech; but becauſe they are furniſhed with conſiderable Nerves, Tendons, and Arteries, which will partake of the Injury; and laſtly, becauſe the *Cranium* is thinneſt in this Part.

Cure of Wounds on the external Parts of the Head.

IV. Wounds that are made on the external Parts of the Head by acute Inſtruments, and not attended with any violent Symptoms, are eaſily cured by the ſame Methods which we have before preſcribed for other Wounds, *Chap.* XIII, *N.* II. Only in order to make the proper Applications, it will be neceſſary in the

the firſt Place to ſhave the Part with a Razor. There will be no Occaſion ever to make Sutures upon theſe Parts, ſince ſticking Plaſters will always anſwer your End. If the Wound be made lengthways on the Integuments of the *Cranium*, after cleaning it well, let the Lips be brought together, and bound with the uniting Bandage. *See Chap.* XIII, *N.* II. If the Wound be tranſverſe, ſome Surgeons adviſe the bloody Suture without Exception. But I ſhould rather chuſe, if poſſible, to cloſe it with Plaſters and Bandages, and heal it like other Wounds: Unleſs there ſhould be any looſe Pieces of Fleſh or Skin, or the Aperture be ſo wide, as not to be united by Plaſters; for in theſe Caſes the true Suture muſt be uſed. You ſhould always endeavour to be as expeditious as poſſible in finiſhing each Dreſſing: The Medicines are to be applied warm, and the Air kept in a moderate Heat with hot Coals. If there ſhould be any great Degree of Hæmorrhage, which will frequently happen from the Number of Veſſels that are liable to be wounded in this Part, it muſt be ſtopped with dry Lint, or, where that is unequal to the Taſk, with the *Alcohol Vini*, *vel Lupi Crepitu*, *vel Pulvere quodam aſtringente.* Theſe Applications ſhould be ſecured with a tight Bandage. After the Hæmorrhage is ſtopped, you may dreſs with *Mel Roſarum*, or ſome digeſtive Medicines, till the Wound is well deterged; and then with a vulnerary Balſam, or dry Lint, till it is healed. If the Hæmorrhage be exceeding violent, the Artery muſt be tied up with a Thread. On the other hand, eſpecially in plethoric Conſtitutions, we ſhould not be too haſty in ſtopping the Blood: For the Diſcharge in this Caſe proves oft-times beneficial, and prevents many bad Symptoms that might otherwiſe enſue.

The Uſe of medicated Bags.

V. It has been frequently the Practice among Phyſicians to order[a] medicated Bags to be applied to the Head, when it has been conſiderably wounded, to prevent or aſſuage the Violence of the Symptoms, ſuch as Tumors, Inflammations, and Pain: Theſe Bags are ſtuffed with *Betonicâ*, *Salviâ*, *Majoranâ*, *Serpillo*, *Origano*, *Roriſmarino*, *Floribus Lavendulæ*, *Salviæ*, *Roſarum*, *& ſimilibus*; theſe they boil in Wine, and after having gently preſſed them, they apply them, as warm as the Patient can bear them, to the wounded Part. Where the Symptoms are already urgent, they make two Bags, and apply them alternately. By theſe Means the inſpiſſated ſtagnating Blood is rendered fluid, and the Miſchief is frequently removed without having recourſe to the Trepan. When the Symptoms are too violent to be removed by theſe Applications, we are forced to uſe other Methods, according to the Nature of the Diſorder. Of theſe we ſhall treat in the ſubſequent Articles.

How Contuſions are to be treated.

VI. In violent Contuſions of the Head, which will be diſcovered by the Tumor and Softneſs of the Part, by the Separation of the Integuments from the *Cranium*, and by the Collection of ſtagnating Blood which appears to be confined under the Skin; you ſhould endeavour to divide the confined Fluids by attenuating Medicines externally applied, or to diſcharge them by making an Opening with a Knife; or laſtly, to bring them to Suppuration. Where the Extravaſation of Fluids is very conſiderable, it is beſt to diſcharge the greateſt Part of them inſtantly by Inciſions, and what remains will be eaſily diſperſed. The Application of the medicated Bags, deſcribed above, will anſwer the Intention of

[a] This Form is entirely laid aſide with us in *England*, and Fomentations made of the ſame Herbs ſubſtituted.

thin-

thinning and dividing the ſtagnated Blood: But you may add to the Ingredients, which we mentioned, *Herba Chamædrys*, *Scordium*, *Sabina*, *Abrotanum*, *Abſinthium*, *Mentha*, *Ruta*, *Flor. Chamomil. Sambuc. Rad. Bryoniæ*, and Things of the like Intention. The Bags that are ſtuffed with theſe Ingredients may be quilted, that they may be divided into equal Parcels, and not run together in Lumps. Where Wine cannot be had to boil them in, you may make uſe of Water, adding a Proportion of Spirits of Wine, or Malt, or Melaſſes, after it has done boiling, and a few Ounces of Soap. But particularly, a Vein ſhould be opened toward the Beginning of the Diſorder, and the Maſs of Blood thinned with proper Infuſions of diluting Herbs, after the Manner of Tea, with all other attenuating Medicines. We ſhall treat more largely upon what is farther to be done in this Caſe, in a following Chapter *upon Contuſions*.

How to bring the Parts to Suppuration.

VII. Where you find it impracticable to attempt the Attenuation and Diviſion of the ſtagnating Fluids, it will be proper to attempt the Suppuration of them. In violent Contuſions it will be adviſeable to preſcribe the Application of ſuch Cataplaſms as are directed above at *Chap.* II, *N.* XIII. and below at *Chap.* XV. But in ſlighter Caſes, where there is an Opening, the *Unguentum digeſtivum cum Aloë et Spiritu Vini pauxillo admiſtum* will do the Buſineſs, covering the Part afterwards with a warm Plaſter, ſuch as the *Emplaſtrum de Meliloto*, *Malacticum*, *Diachylon ſimplex vel compoſitum*, *vel Empl de Galbano*. After the Suppuration is formed, and the Matter diſcharged, the Wound will eaſily heal by the Application of a vulnerary Balſam. But in violent Contuſions, where there is no Opening, or a very ſmall one, by which the Matter cannot be diſcharged, you muſt enlarge the Wound with your Knife, to prevent the neighbouring Parts from being corroded. By this Means the Wound will eaſily be cleaned, and by obſerving the Directions we have frequently laid down above, the Cure will be ſpeedily performed; and you will eaſier diſcover whether the Scull be ſound or fractured.

Of Wounds in the *Pericranium*.

VIII. When the *Pericranium* is wounded, but not in ſo great a Degree as to lay the *Cranium* bare, treat the Wound in the Manner we deſcribed above at *N.* IV. *of this Chapter*; omitting the Uſe of the vulnerary Oils there preſcribed, becauſe they would injure the *Cranium*, and ſubſtituting in their Room ſome warm balſamic Medicines, ſuch as the *Balſamum Peruvianum*, *Copaivæ*, *Spir. Terebinth. Eſſentia Myrrhæ*, *Succini*, *Spir. Maſtichis*, and others of that Kind. But where the *Cranium* is left bare and expoſed to the Air, its internal Lamella, being robbed of its Nouriſhment, by the Deſtruction of the Veſſels by which it was conſtantly ſupplied, will loſe its natural Colour, and become yellow, livid, black, and by degrees ſeparate from the neighbouring Parts, and exfoliate, as we term it, which will greatly protract the Cure of the Wound.

Method of treating the *Pericranium* and *Cranium*.

IX. To prevent the Corruption of the *Cranium*, and the Separation of its Lamina, and to expedite the Cure, the Surgeon ſhould immediately cover the denudated Part, by drawing over the Skin, if it has not been too long expoſed to the Air. He ſhould then dreſs it with proper Plaſters and Sutures: By which Means the Cure is commonly effected without Exfoliation. Even where the Part has changed Colour, it is not always neceſſary to wait for a Separation of the Lamina; as many are of Opinion it is often ſufficient to apply dry Lint to the naked Bone, and dreſs the Wound with a Digeſtive: By which Method alone it generally heals. In order to haſten the Exfoliation of the *Cranium*, and

forward

forward the Cure, the Surgeon ought to bore ſeveral [a] Holes through the denudated Part, as deep as the *Diploë*, with an Awl, or with Inſtruments like thoſe deſcribed at *Plate* VII, *N.* II. *and Fig.* 7. *Lett.* A. This Operation does not only forward the Exfoliation of the Part, but make way alſo for the ſprouting up of freſh Veſſels, and forming as it were a new *Pericranium*. The Dreſſing, which ought to be performed each Time with Expedition, and not repeated ſo often as in other Caſes, is to be applied in the following Manner. When the Wound is properly cleaned, Pledgits, firſt dry, afterwards well-ſaturated with *Eſſentia Maſtichis*, *Succini*, or any other mild balſamic Medicine, with the Addition of a ſmall Quantity of *Mel Roſarum*, are to be laid upon the injured Part of the *Cranium*: Over theſe you may clap the *Emplaſtrum de Betonica*, and over that the Bolſters and Bandage for the Head (Fr. *Couvre chef*) deſcribed above at *Plate* III, *Fig.* 1. A. Theſe Applications ſhould be continued till the *Cranium* appears to be ſound, and the Wound is in a Condition to heal. When the *Pericranium* is contuſed, but not ſeparated from the *Cranium*, you muſt endeavour to diſperſe the ſtagnating Fluids, by the Application of medicated Bags, deſcribed at *N.* V, VI. If theſe have not the deſired Effect, you may have recourſe to Scarification, and warm Fomentations.

Of Wounds in the temporal Muſcles.

X. If the temporal Muſcles are wounded by a cutting Inſtrument; when the Wound is cleanſed, it muſt be treated in the common Method. Should the Artery ſuffer, the Hæmorrhage muſt be ſtopped either by Pledgits, Compreſſes and Bandages, or by a Ligament of Thread. If the Wound be made by Puncture or Contuſion, you muſt have recourſe to the medicated Bags; and what extravaſated Blood lies beneath, ſhould be drawn off, by Inciſion. When we find that the *Cranium* is fractured under theſe Muſcles, and that there is concreted Blood under the Fracture, then an Inciſion may be made in the Muſcle lengthways, or obliquely, if it be judged neceſſary; that the Wound may be cleared of the ſtagnated Blood and the Fragments of the *Cranium*, if there be any, in order to facilitate its healing.

Of Injuries of the *Cranium*.

There are ſeveral Ways by which the *Cranium* may be hurt; by Falls, Blows, Cuts, *&c.* which has occaſioned Authors to divide Injuries of this Part into ſeveral Diſtinctions; to wit, into Contuſions, Depreſſions, Fractures, Fiſſures, and [b] Contra-Fiſſures, that is, where the Fiſſure happens on the Side oppoſite to that which received the Blow.

Diagnoſtic Signs.

XI. There are ſeveral Circumſtances concerned in diſcovering an Injury of the *Cranium*. In the firſt Place, you muſt diligently inſpect the wounded Part, and make Enquiry with what Force the Blow was given that occaſioned it: After this you may ſearch the Wound with a Probe, but very circumſpectly, leſt by puſhing it raſhly forward you ſhould injure the Brain. Some uſe a Pen in the room of a Probe, when they are ſearching for Fiſſures of the *Cranium*, and if the Pen is pointed at the End like a Tooth-pick, it will eaſily detect any Inequality or Roughneſs of the Bone: But you muſt be very careful not to ſuffer yourſelf to be deceived, as HIPPOCRATES was, by the Sutures. When Fiſſures of

[a] See HILDAN. *Cent.* iv. *Obſ.* 95. and RUYSCH. *Obſ.* 5.

[b] Many Writers have denied this Caſe to be poſſible; but not only HIPPOCRATES, in his Book *De Vuln. Capit.* but CELSUS, *Lib.* viii. *C.* 4. and ÆGINETUS, *Lib.* vi. *C.* 90. have plainly deſcribed this Caſe; but amongſt the Moderns D. WAGNER, in a Treatiſe *De Contra-fiſſurâ*, and LE MAIRE, *De Reſcuitu*, have put this Matter out of all doubt.

the *Cranium* are ſo very fine, that they eſcape the Eye, and the Touch of the Probe, though the Violence of the Symptoms ſufficiently declare that the Patient has received an Injury of this Kind, it will be neceſſary to lay the Bone bare, and to drop Ink upon the Part of it which you ſuſpect, and wipe it off again immediately with Lint: And if any Part of it is fiſſured, you will find a black Stroke remain, notwithſtanding your Endeavour to wipe the Bone clean. If you are ſtill at a Loſs, put a Key into your Patient's Mouth, and bid him bite hard upon it. If this occaſions a Stridor of the Teeth, and Pain, Surgeons are apt to determine that there is a Fracture or Fiſſure in the *Cranium*. Where the Bone has loſt its natural Colour, they will not allow it to be whole. The moſt certain Signs of a fractured *Cranium* are the violent Symptoms that immediately ſucceed the Injury: Such as vehement Pains, Vomitings, Vertigo, and Noiſe in the Ears; yet theſe are not always to be depended on: If Blood at the ſame time is diſcharged from the Noſe or Ears, the Senſes and Reaſon entirely loſt, and the Patient is continually ſleeping, the Matter is out of all doubt. In a few Days after the Wound is received you will have a ſmall Diſcharge of thin fetid Matter: About the ſeventh Day the Integuments ſeparate from the Bone, and the *Cranium* itſelf is ſometimes ſo very foul, that it lets the Matter through to the Membranes of the Brain, which preſently partake of the Diſorder, and occaſion acute Pains, Spaſms, Drowſineſs, Loſs of Motion, or Rigor of the Limbs, Loſs of Speech, Apoplexy, and at length Death. All theſe Miſchiefs may ariſe from a very ſmall Fiſſure of the Scull, Examples of which you will find very frequent amongſt the Writers in Surgery.

XII. This ought to teach us to be very cautious in delivering our Opinions concerning the Event of Wounds in the Head; for we can never promiſe a Cure, though the Wound ſhould at firſt appear to be very ſlight. On the other hand, many who labour at firſt under violent Symptoms, by Bleeding and proper Remedies have been known to recover beyond Expectation. I ſhall here lay down ſome Obſervations which are well worthy of a Surgeon's Attention: It is very difficult to cure a Man who is poxed, or of a ſcorbutic Habit, at the Time he receives a Fiſſure in the *Cranium*. When the temporal Bone is the Subject of the Injury, the Cure is very doubtful. There remain very little Hopes of Recovery where the *Cranium* appears black. They alſo are in extreme Danger who have a black dry Tongue, full of Clefts, and beſet with Puſtules, or are attended with a Diarrhœa or Dyſentery, or where the Water is either quite clear and white, or as turbid as the Urine of Cattle. Prognoſtic.

XIII. The firſt Queſtion to be aſked, when you come to examine a Wound of the Head, is, whether it was made with a ſharp or a blunt Inſtrument? If the Wound was made with a ſharp Inſtrument, and penetrates into the *Cranium*, it muſt be filled at the firſt Dreſſing with dry Lint, in order to ſtop the Blood; but in the following Dreſſings, after the Matter is well wiped away, you may apply the *Eſſentia Succini*, *Maſtichis*, *Myrrhave*, *cum admixto Roſarum Melle*. Theſe Dreſſings are to be repeated as long as the Condition of the Wound ſhall require it. *See above*, *N.* IV. Where the *Cranium* is very much ſhattered by the Blow, and the Brain wounded, this Caſe is attended with very great Danger, but requires the ſame Method of Treatment with the former, only greater Diligence muſt be obſerved in cleanſing this Wound, and the more Expedition in applying the Dreſſings, to keep it from the Injuries of the Air. If the *Cranium* How Injuries of the *Cranium* are to be treated.

is ſo perforated by a cutting Wound, that it cannot well be cleanſed from the Blood or Splinters; or by a Puncture, that brings on any dangerous Symptoms, the Trepan muſt be applied. If a Piece, quite broke off from the *Cranium*, yet ſticks to the Integuments; that Piece, after cleanſing the Wound, ſhould be reſtored to its Place, the Skin ſtiched together, and the Wound properly dreſſed. This Method generally ſucceeds.

Wounds of the Head with a blunt Inſtrument.

XIV. When a blunt Inſtrument is the Occaſion of an Injury upon the *Cranium*, if the injured Part does not ſufficiently appear of itſelf, we ought to uſe great Induſtry to diſcover it.

How the Wound is to be examined.

XV. You will eaſily diſcover the injured Part, if you divide the common Integuments to the Bone, where they appear tumid and ſoft: In making your Inciſion you ſhould take great Care not to lay too much Streſs upon your Knife, leſt you ſhould force Splinters of the fractured *Cranium* into the Subſtance of the Brain.

How the Inciſion is to be made.

XVI. If you find it neceſſary to make an Inciſion through the Integuments, it may be made in a right Line; but where that is not ſufficient, let it be formed like the Letter X, about an Inch and an half in Length, lifting up the Skin at each Angle, and leaving the Bone bare. The Blood which is ſpilt may be taken up with a Sponge, and dry Lint ſtuffed between the Skin and the *Cranium*. Having found out the injured Part of the *Cranium*, you may now apply the *Trepan* if you ſhall think it neceſſary. Some Surgeons in ſcalping prefer the Figure of the *Roman* Letter V, or the *Greek* Λ; others prefer a longitudinal Inciſion. In Wounds which are made near the Temples, great Care muſt be taken not to divide the muſcular Fibres. There are Surgeons who contend much for an Inciſion in the Form of a T. But the Situation of the Wound will always determine you with regard to the Figure of the Inciſion which you ſhall make, either for the Diſcovery of a Fiſſure, or to prevent or remove bad Symptoms.

What is to be done after Scalping.

XVII. Having diſcovered the injured Part of the *Cranium*, and cleared away the grumous Blood and Matter with a Sponge, you are next to remove any Splinters of Bone that may come in your way, with your Fingers or the Forceps: Where they hang to the *Pericranium*, you muſt uſe the Sciſſors: Where they adhere pretty firmly to the neighbouring Parts of the *Cranium*, it is more adviſeable to replace them, than to endeavour to remove them by Violence. But if there are no Splinters or Fragments of Bones, and the *Pericranium* is bruiſed, inflamed, or bloody, you ſhould then ſcarify the Part, and proceed as above at *N.* VIII.

How a Contuſion is to be treated.

XVIII. But if the *Pericranium* is quite corrupted and ſeparated, cover the Bone with dry Lint; or bore ſeveral ſmall Holes through the external Lamella of the Bone, till you find Blood proceed from the wounded *Diploë:* After this you may dreſs the Part up with balſamic Medicines, (*N.* IX.) If upon repeating the Dreſſings you diſcover freſh, yellow, or black Spots, the Parts ſo diſcoloured are to undergo the ſame Operation. This is the eaſieſt and moſt expeditious Way of remedying this Diſorder.

How Fiſſures are to be treated.

XIX. When you diſcover a Fiſſure in the *Cranium*, attended with no other bad Symptoms, but white, yellow, or brown Spots upon the Face of the Bone, you will find it ſufficient to bore down to the *Diploë*, and dreſs it with warm balſamic Medicines: In the mean time Bleeding and Diluters muſt not be omitted.

ted. There is not always Occaſion for *Trepanning* in Fiſſures, as many beſides HIPPOCRATES have declared. But where any violent Symptoms come on, which demonſtrate an Extravaſation of Blood in the Cavity of the *Cranium*, which cannot be evacuated or diſperſed by the Methods abovementioned, the *Trepan* is to be called for without Delay.

The Method uſed by the Antients in this Caſe.

XX. The Surgeons amongſt the Antients uſed another Method for the Cure of Fiſſures of the *Cranium*, that were not attended with very bad Symptoms. Their Method was to ſcrape away the upper Table of the Bone, 'till they came down to the *Diploë*: For this Purpoſe they uſed *Rugines*, or *raſping Chiſſels*, of different Shapes, ſemi-circular, plain, or acuminated, as you may ſee in *Plate* VII, *Fig.* 3, 4, 5. This Practice is ſtill continued by ſome; but the Method of boring is far leſs troubleſome, and therefore juſtly preferred to it.

Of DEPRESSIONS *of the* CRANIUM.

Of Depreſſions of the *Cranium*.

XXI. The Skull in Infants and Children is ſometimes depreſſed or dented in by a Blow, like Tin or Copper, without any manifeſt Fracture; or at leaſt fractured in ſuch a Manner, that from its Flexibility it does not ſtart out, but ſtill adheres firmly to the neighbouring Bones. But in Adults this Caſe cannot happen; for the Bones in them are become ſo rigid, that it is impoſſible to beat in any Part of the *Cranium* without breaking the Bone to Pieces. Theſe Injuries of the *Cranium* are called by the Surgeons *Fractures* or *Depreſſions*: The Brain is frequently injured by theſe Accidents, and the Actions of it diſturbed.

Diſorders occaſioned by it.

XXII. Theſe Accidents are attended with full as bad Conſequences as thoſe we have already deſcribed. According to the Degree of Depreſſion, ſo is it attended with more or leſs Danger. Sometimes it is quite incurable: For in this Caſe the Veſſels of the Brain are very liable to be injured, which frequently produces ſuch an Extravaſation of Blood in thoſe Parts, as muſt neceſſarily bring on grievous Diſorders, and frequently Death itſelf.

A Fracture in the *Cranium* is eaſily diſcovered.

XXIII. You may eaſily diſcover a *Fracture* or *Depreſſion of the* CRANIUM; 1. By your Eye. 2. By the Touch. 3. By conſidering the Cauſe of the Injury. 4. By the Symptoms that ſucceed it; though theſe alone are very uncertain. Depreſſions and Fractures of the *Cranium* are by no Means ſo difficult to diſcover as Fiſſures. That Fractures of the Skull are attended with great Danger, and frequently with Death, nobody will deny, who conſiders well the Structure of the neighbouring Parts.

How it is to be treated.

XXIV. The firſt Thing to be done towards relieving this Diſorder, is to lift up any Part of the Bone that is depreſſed, or beat in upon the Brain, and replace it, if it ſtill adheres to the neighbouring Bones; or to remove any other Body by which that Part is compreſſed. Sometimes a Splinter, which is quite ſeparated from the reſt of the Bone, is driven into the Cavity of the *Cranium*, and lies conſtantly vellicating the Brain and its Membranes with its pointed Parts. This is to be removed without delay, yet very tenderly, and with the Caution we recommended, *N.* XVIII.

How ſlight Depreſſions in Infants are to be treated.

XXV. When ſlight Depreſſions are made in the Sculls of Infants, without bringing on any bad Symptoms, you muſt not uſe the forcible Methods of raiſing the depreſſed Part, which we directed above; but call thoſe Medicines into

into Uſe which we adviſed for the Cure of Contuſions, ſuch as the medicated Bags boiled in Wine, or Spirit of Wine camphorated; or, laſtly, apply a Plaſter to the Part, ſuch as the *Emplaſtrum de Meliloto, ſive de Betonicâ.* Nor muſt you omit internal attenuating Medicines, *N.* V. Theſe Applications frequently cure ſlight Impreſſions, and prevent the miſchievous Conſequences which might be expected from them.

How a larger Depreſſion is to be treated.

XXVI. But where a greater Degree of Depreſſion happens to Infants, the Elevation or Reſtitution of the Parts is performed in the following Manner. After ſhaving the injured Part, they apply a Plaſter made of very ſticky and gummy Materials, ſpread upon a ſtrong Piece of Leather, to the Middle of which a Cord is faſtened. This Plaſter is laid on pretty warm, and left in its Situation till it is grown cold: The Surgeon then taking hold of the Cord that is faſtened to it, pulls the Plaſter directly upwards, and with it the depreſſed Part of the *Cranium*. *See Plate* VII, *Fig.* 6. If this does not ſucceed at the firſt Trial, it is to be repeated. The Application of the Cupping-glaſs to the depreſſed Part will ſometimes ſucceed, eſpecially if you ſtop the Patient's Breath at the Noſe and Mouth during the Operation. But if neither the Plaſter nor Cupping prove of any Service, it will be neceſſary to call for the Aſſiſtance of an Inſtrument like an Awger; ſuch an one as you ſee deſcribed at *Plate* VII, *Fig.* 7. *Lett.* B; which is to be applied after the common Integuments and *Perioſteum* are removed. ROHAULT rejects both the Cupping-glaſs and Awger, and adviſes the *Trepan* in their ſtead, where the Symptoms are bad. See his Treatiſe above cited, p. 53.

How a fractured *Cranium* is to be treated.

XXVII. But when the *Cranium* is ſo depreſſed, whether in Adults or Infants, as to ſuffer a Fracture, or Diviſion of its Parts, it muſt inſtantly be relieved. The Part depreſſed, which adheres, after cleanſing the Wound, muſt be reſtored to its Place; what is ſeparated muſt be removed, and the extravaſated Blood be drawn off through the Aperture. Some are very high in their Commendations of a ſternutatory Powder for this Purpoſe, aſſerting that the Diſtention of the Brain is ſo violent in the Act of Sneezing, that it will reſtore the depreſſed Parts of the Bone to their former Situation; but the ill Conſequences that may attend this Practice are ſo grievous, that in my Opinion it ought to be rejected. You will find the Elevatories deſcribed at *Plate* VII, *Fig.* 7. *Lett.* C, *and at Fig.* 8. very ſerviceable, if there is a ſmall Foramen to which the Inſtrument can be faſtened. But if there is no Hole already in the Part, you muſt apply the ſcrew End of the Inſtrument at *Fig.* 7. *Lett.* B, or one of that Kind, by which Application the depreſſed Part may be reſtored. In the mean time an Inciſion ought always to be made through the common Integuments, that they may be drawn back for the Inſtrument to take place, *N.* XV. and a Foramen ſhould be made with a ſharp-pointed Inſtrument, (*Fig.* 7 *or* 2. *Lett.* A) to admit of the End of the *Trepan*.

A particular Kind of Elevatory with three Feet.

XXVIII. But as the Elevatories at *Fig.* 7 and 8. are ſo contrived, that where the neighbouring Bones are depreſſed or fractured, theſe Inſtruments cannot be applied without Danger of encreaſing the Complaint, it appeared neceſſary to the Surgeons amongſt the Antients to invent another Inſtrument for this Purpoſe, which might be applied with more Safety; this they called, from the Number of its Feet, *Tripes*, *Tab.* VII, *Fig.* 12. It is near twice as big as the Figure we have given you. The Feet AAA may be placed at farther

ther Diſtances, or brought nearer to each other, as you ſhall ſee occaſion. The Manner of applying it is this. The Feet of this Inſtrument are applied to the ſound Parts of the Head; and the Screw B, C, by frequently turning round its Handle D D, will preſently lay hold of the depreſſed Part of the *Cranium*, eſpecially if you have before-hand made a ſmall Hole in the Middle of it with the Awl at *Fig.* 2. Upon turning the Screw, E E, the *Trepan* is raiſed by Degrees, and with it the depreſſed Part of the *Cranium*. You will conceive this more clearly by examining *Plate* VII, *Fig.* 13. But if any Opening ſhall appear between the fractured Parts of the *Cranium*, it will be better to take off the pointed End of the Inſtrument, and in its room fix the Elevatory G, by the Screw H, about the Part at Letter F of *Fig.* 12. and by the Aſſiſtance of this the depreſſed Part may be raiſed, as we taught above.

HILDANUS's Elevatory.

XXIX. HILDANUS deſcribes an Inſtrument for this Intention, which is a much ſimpler Inſtrument than that which we have juſt ſhewn you, and a very convenient one for the Purpoſe, *See* FAB. HILDAN. *Cent.* II. *Obſ.* 4. We have given you a Deſcription of this Inſtrument in *Plate* VII, *at Fig.* 14. You ſhould be provided with the Awger A, and the Hook at *Fig.* 15.; through either of which, according as you ſhall ſee neceſſary, the Lever B C may be paſſed, after the Inſtrument is fixed upon the depreſſed Part of the *Cranium*. The Plate D is to be placed upon the ſound Part of the Head, laying Bolſters under it to prevent Pain: Then by raiſing the End of the Lever at B, the depreſſed Part of the *Cranium* will be gently elevated and reſtored to its natural Situation. You will obſerve a Joint at the Extremity of the Lever C, to accommodate the Plate D to the Convexity of the Head in ſome Parts of it, which may be alſo raiſed or depreſſed by the Screw E. If you pleaſe, you may make the Lever longer than it is repreſented here, which will add to its Force. PETIT has deſcribed a new Kind of Lever[a]; which I have given you the Figure of, *Plate* XXXIX. as it may ſometimes be of Service.

A particular Way of removing Splinters.

XXX. But if any Part of the Bone is entirely ſeparated from the reſt, and driven ſo deep into the Cavity of the *Cranium*, that it cannot be elevated or extracted by the Methods which we have already oppoſed, you muſt perforate the neighbouring ſound Part with a *Trepan*, and divide the intervening Part with a fine Saw, *Fig.* 9. as deep as you ſhall think you can with Safety. After this you may cut it entirely through with the Chiſſel and Leaden Mallet at *Fig.* 10, *and* 11. Having made an Opening in this Manner, you will have a full command of any Splinters or foreign Bodies that are driven into the *Cranium*, and will more eaſily evacuate the extravaſated Blood. Caſes that require this laſt Method of operating are very rare, but they are no leſs neceſſary, though the Operation requires great Pains and Dexterity in the Performance of it.

How to ſecure the Parts in the Situation you have reſtored them to.

XXXI. Having raiſed up the depreſſed Parts of the *Cranium*, and reſtored them to their natural Situation, you muſt take great Care to ſecure them from a freſh Depreſſion; the Patient ſhould lie on the ſound Side of his Head, the fractured or depreſſed Part ſhould be guarded with a Braſs or Steel Plate, and the wounded Part ſhould be treated according to the Rules which we have already laid down.

[a] *Memoires de Chirurgerie*, Tom. i. p. 302.

EXPLANATION

EXPLANATION *of the* SEVENTH PLATE.

Fig. 1. *An artificial Eye* made of Glaſs or Silver, painted after the Life; this may be introduced into the Orbit, and ſupply the Place of the natural Eye, and prevent the Deformity that will enſue upon the entire loſs of that Organ.

Fig. 2. *An Awl*, or ſharp Inſtrument to perforate the external Table of the *Cranium*.

Fig. 3, 4, 5. Different Forms of *Rugines*, or *raſping Chiſſels*, to ſcrape the *Cranium*, or other Bones.

Fig. 6. Shews how the *Depreſſion of the Cranium* in an *infantile State* may be relieved by ſticking Plaſters.

Fig. 7. A, a quadrangular, or pointed Steel Inſtrument, to perforate the external Table of the *Cranium*. B, an Awger. C, an Elevator to raiſe depreſſed Bones of the *Cranium*

Fig. 8. Another Elevator for the ſame Uſes with the former.

Fig. 9. A ſmall fine Saw; and *Fig.* 10. a ſmall Rugine, which may be uſed with or without the Handle deſcribed to that at *Fig.* 3.

Fig. 11. A wooden Mallet, the Head of which is filled with Lead.

Fig. 12. An Elevator with three Feet. See above, *N.* XXVIII.

Fig. 13. Deſcribes the Method of applying this Inſtrument.

Fig. 14. HILDANUS's Elevator. See above, *N.* XXIX.

Fig. 15. A Hook belonging to HILDANUS's Elevator.

How extravaſated Blood is to be diſcharged from the CRANIUM.

Diſorders occaſioned by Extravaſation of Blood.

XXXII. In the Injuries of the *Cranium* that we have been deſcribing, that is, in Contuſions, Fiſſures, Depreſſions, and Fractures, one or more of the Blood-veſſels that are diſtributed upon the *Dura Mater* is frequently divided. The Blood that is diſcharged by this Accident greatly oppreſſes the Brain, and diſturbs its Offices; this frequently brings on violent Pains, Deprivation of Senſes, and other Miſchiefs, and at length Death itſelf, unleſs the Patient be timely relieved. If the Quantity of extravaſated Blood be ever ſo ſmall, it will certainly corrupt, and affect the *Meninges* and the Brain itſelf with the ſame Diſorder; from hence will proceed violent Inflammation, Delirium, Ulcers, and what not? even Death itſelf, ſooner or later. And this will frequently be the Caſe after a violent Blow upon the *Cranium*, when a Vein or Artery is wounded, though the Bone ſhould eſcape without any Injury.

Where the Blood is ſpilt.

XXXIII. In theſe Injuries of the Head, the Blood is ſpilt either between the *Cranium* and *Dura Mater*, or between the *Dura* and *Pia Mater*, or between the *Pia Mater* and the *Brain*; or laſtly, into the *Sinuſes of the Brain*. Each of theſe Caſes are attended with great Danger, but the deeper the Extravaſation happens, and the more copious the Diſcharge, ſo much the greater will the Danger be.

How to diſcover an Extravaſation of Blood in the *Cranium*.

XXXIV. You may ſuſpect that Blood is extravaſated in the Cavity of the *Cranium* from the Violence of the Symptoms which ſucceed: If the Patient lies

Fig: 1.

Fig: 2.

Fig: 3.

Fig: 4.

Fig: 5.

Fig: 10.

Fig: 11.

Fig: 9.

Fig: 8.

A

B

Fig: 14.

A

B

C

E

D

Fig: 15.

B

A

Fig: 7

Fig: 6.

C

D

C

D

Fig: 12.

E

E

A

F

B

H

G

A

Fig: 13.

ſtill without Senſe or Motion; if Blood flows from the Mouth, Ears, or Noſe; if the Eyes are much inflamed and ſwelled; if Vomiting ſucceeds; when upon the Remiſſion of theſe Symptoms the Patient complains of a remarkable Heavineſs of Head, a Sleepineſs, Vertigo, Blindneſs, Spaſms, and Diſorders of this Kind. When the Quantity of extravaſated Blood is very conſiderable, and oppreſſes the *Cerebellum*, the Patient dies upon the Spot: But when the Extravaſation is not in a very large Quantity, or at leaſt does not affect the *Cerebellum*, Life ſtill remains, but the Symptoms related above come on. Sometimes theſe Symptoms come on very ſlowly; and great Numbers of Perſons, who have appeared at firſt to have been but ſlightly wounded, have died in this Manner, after ſome Time, contrary to all Expectation. Therefore I cannot help again admoniſhing the Surgeon, that after violent Blows of the Head, though no violent Symptoms ſhould immediately urge, yet he ſhould be very cautious in delivering his Prognoſtic, and not be too haſty in his Opinion; nor, by treating the Caſe as ſlight and indifferent, endanger the Life of his Patient. But when violent Symptoms immediately enſue, you may always be ſure that there is an Extravaſation of Blood, though no great Injury appears upon the external Part of the Head.

How to diſcover the Part in which the Blood is extravaſated, though there appears no external Wound.

XXXV. If you can find no Fracture, Fiſſure, or Contra-fiſſure, in the *Cranium*, nor even any external Injury upon the Integuments of the Head after a violent Blow, and the Patient is deprived of his Senſes, you will find it difficult to determine in what Part of the Head an Extravaſation is ſeated. It will be proper therefore, 1. To ſhave the Head all over, that you may be the better able to examine it. For if any Part is ſofter than ordinary, or enlarged, or red from a Stagnation of Blood, it is plain that this is the Part which received the Injury. You may alſo examine Perſons who were preſent at the Accident, from whom you may frequently get Light into the Affair. But, if you are ſtill left in the Dark, 2. Cover the whole Head, after it is cloſe ſhaved, with an emollient Plaſter, laying over it medicated Bags well heated: This Application will, in a few Hours, produce Tumor and Softneſs upon the injured Part. 3. Sometimes the Patient, though he lies ſpeechleſs, and to all Appearance ſenſeleſs, will be continually clapping his Hand to the aggrieved Part. 4. If either Side of the Patient has loſt Senſe and Motion, and is become paralytic, it is an apparent Sign, whatever ſome may think to the contrary, that the Injury was received on the contrary, or ſound Side. *See* MORGAGNI *Adverſaria Anatomica* VI. *et Diſſert. de Reſonitu, Argentorat.* 1722. *Edit. Pag.* 23. If you diſcover any Wound in the Skin, you ſhould enlarge it with the Knife, till you come at the Injury in the *Cranium*, whether Depreſſion, Fiſſure, Contra-fiſſure, or Fracture.

How the injured Part is to be treated.

XXXVI. When you have diſcovered the Seat of the Injury, the firſt Intention is to diſcharge the extravaſated Blood, which muſt otherwiſe endanger the Patient's Life; and then to clean the Wound, and remove all Splinters or extraneous Bodies. Many Writers in Surgery adviſe the inſtant Uſe of the Trepan, to make way for a Diſcharge of the extravaſated Blood; but ſince this is a difficult and dangerous Operation, and many have recovered without having Recourſe to it, I ſee no Reaſon for attempting it, unleſs we are driven to it by abſolute Neceſſity. Therefore I think it is beſt to try firſt the Force of attenuating and dividing Medicines in this Caſe.

XXXVII. With

How inſpiſſated Blood ſhould be attenuated.

XXXVII. With this Intention, 1. Open a Vein, and draw away as much Blood as the Strength of your Patient will admit: This will take off the Impetus of the Veſſels, and prevent the Extravaſation of more Blood. 2. Preſcribe a pretty briſk Purge, to leſſen the Quantity of Fluids, for which Purpoſe you may alſo give ſharp Clyſters. 3. Foment the Head with medicated Bags, and apply a Melilot Plaſter to it. 4. Endeavour to rouſe the Patient by volatile Applications to his Noſtrils, ſuch as *Sol volatile oleoſum*, *Spiritus Salis Ammoniaci*, *vel Spiritus Cornu Cervi per ſe.* Laſtly, 5. Give frequently attenuating Fluids warm, ſuch as Infuſions prepared *ex Theâ*, *Betonicâ*, *Salviâ*, *Roriſmarino*, *Lavendulæ Floribus*, *Ligno Saſſafras*, and the like. This Method will contribute greatly to the thinning and diluting the Blood.

XXXVIII. Yet this does not immediately procure the deſired Effect, therefore it muſt be continued for ſome Time, and the Preſcriptions frequently repeated: And more particularly when the Symptoms ſeem by degrees to abate. The Repetition of Bleeding in this Caſe may ſeem ſtrange to ſome, but it muſt be to thoſe who are ignorant of the good Effects it produces by leſſening the Quantity of Fluids, and by reſtoring the Courſe of the ſtagnating Blood. If the Patient finds a little Relief from the firſt Bleeding, it will be proper to repeat the Operation a ſecond and a third Time, eſpecially if he is young and athletic, and to apply the Remedies which we have recommended above in the Intervals, till the Diſorder is entirely removed.

Sometimes the Trepan is neceſſary.

XXXIX. But when you find, notwithſtanding theſe Applications, that the Symptoms rather encreaſe than abate, you will be obliged to make a Perforation in the *Cranium* with the *Trepan*, near the Seat of the Wound, that there may be a Paſſage for the Diſcharge of the confined grumous Blood. But there ſhould be great Caution always uſed in this Operation. If the extravaſated Blood or Matter be collected under the *Dura* or even the *Pia Mater*, an Inciſion muſt be made in theſe Membranes, without reſerve; that the Enemy may be removed: The Wound is then to be cleanſed, and afterwards healed by proper Applications. When you cannot diſcover the Part of the Head which is principally affected, and the Symptoms are ſtill as violent, or rather aggravated, you muſt perforate the Scull in ſeveral Places, till you hit upon the right. For, if this Method does not always produce the Effect deſired; yet, with CELSUS, it is far better to try a doubtful Remedy, than no Cure at all. I ſhall teach the Manner of performing this Operation, and the Methods of healing the Wound, in another Part of this Work, which treats profeſſedly of *Chirurgical Operations.*

Principal Writers on Wounds of the Head.

XL. If you deſire to ſee Hiſtories of Cures of Wounds of the Head, conſult HIPPOCRATES *De capitis Vulneribus*, *cum* ARANTII *&* PAAWII *Commentariis*, and CELSUS on the ſame Subject. Add to theſe, BERENGARIUS *De Fracturâ Cranii*, ARCÆUS *de Vulneribus*, SCULTETUS *in Obſervationibus*, 1 *ad* 23. HILDANI *Obſervationes variæ*, TULP. *Obſ.* L. i. C. 14. SCHULTZIUS, *De Capite læſo*, BELLOSTIUS *in Chirurgo Noſocom.* WOYTIUS and WALTHERUS *De capitis Vulneribus*, and ſeveral others: But particularly amongſt the modern Writers, ROHAULT's Book on Wounds of the Head, called *Traité des Playes de Tête*, 4*to*, 1720, and LE DRAN, *in his Chirurgical Obſervations.*

CHAP.

CHAP. XV.

Of CONTUSIONS.

I. A CONTUSION is any Hurt of the Body that is inflicted by a blunt Instrument: And since in this Case an infinite Number of small Vessels and Fibres are injured and broken, a Contusion may properly be said to be a Congeries of an infinite Number of exceeding small Wounds. It is well enough called by the GREEK PHYSICIANS *Ecchymosis*, and by CELSUS *Vulnus Collisum*, *Lib.* V. *Cap.* 26. A Contusion what.

II. Contusions may be distinguished into several Sorts; 1. Some may be called *simple Contusions*, that is, when only the soft external Parts are injured: Some are *compound*, when the internal or bony Parts also partake of the Injury. 2. So some Contusions are slight, some of great Consequence; others prove mortal, and in some Cases immediately. This depends upon the Cause of the Injury, and the Nature of the Part injured. 3. Lastly, some Contusions are so circumstanced, which is very wonderful, that the internal Parts should be violently affected, whilst the external Parts remain whole and unhurt; for we are experimentally taught, that a Man may receive a Blow with a blunt Weapon, or even with a naked Hand, upon the Head, Breast, or Belly, which shall occasion instant Death, though there shall appear no external Signs of Injury. *See* BOHNIUS *De Vulner. Lethal. Sect.* I. *Cap.* I. Differences.

III. Contusions are usually occasioned, 1. By violent Blows given with blunt Weapons, such as Staves, Bludgeons, or Stones, or a Bullet almost spent. 2. The same will happen from a Fall upon the Stones, or any other hard Body. 3. Contusions are occasioned by the Body being pressed between two Doors, by Presses, Screws, Mills, Wheels, and such like Machines: For, by Accidents of this Kind the Vessels are either entirely broken, or the Blood is violently squeezed out of them, Causes of Contusions.

IV. When the small Vessels and Fibres have been broken by a Contusion, the Fluids that were contained in them will be forced out: Hence will proceed Obstructions, Corruption, Inflammation, and Ulcers, or even Gangrene, and several other fatal Mischiefs, in Proportion to the Violence of the Cause, and the Nature of the affected Part. When the external Parts are contused, the Skin at the same Time remaining whole, the Blood will stagnate under it, and occasion red, black, and livid Spots, which we call a *Sugillation*: From whence arise several other Mischiefs; and if this happens near a Bone, a Caries, or a Fracture. What succeeds a Contusion of the soft Parts.

V. When a bony Part is the Subject of a Contusion, then, 1. The same Mischiefs will ensue from the Injury inflicted upon the *Periosteum*, which we have already described as happening to the *Pericranium* in Wounds of the Head. But when this Disorder, 2. Is accompanied with a Fracture, the same Mischiefs will ensue, which usually attend fractured Bones, and these always increase in Proportion to the Force of the Blow; on which Account the Contusions from Bullets, *&c.* are generally attended with the worst Consequences. If the Injury is in the Bones of the *Cranium*, the *Thorax*, or the *Vertebra*, you may expect all the Mischiefs, of which we have largely spoken above in the preceding Chapters. Lastly, 3. When the medullary Juice of the Bones is affected, you Of the Bones.

may expect every violent Disorder, whether the Bones are fractured or not. For the Blood which is discharged out of the Vessels that are sent to the *Medulla*, will presently corrupt and produce a Gangrene; or, by corroding the Bones, bring on a Caries, Ulcers, and incurable Fistulæ; which will make it necessary to take off the Limb to save the Life of the Patient: For the medullary Juice is in the same Condition in these Cases with the Brain in Fractures or Contusions of the *Cranium*.

Of the Joints and Muscles.

VI. Contusions of the Joints usually bring on violent Pains and Inflammations, Convulsions, Gangrene, Sphacelus, Rigidity of the Limbs, and Caries. The same will sometimes happen from Contusions of the muscular Parts. When the internal Parts are contused, great Mischiefs usually ensue, but that depends entirely upon the Nature of the injured Part, and the Degree of the Injury: Sometimes Inflammations, Rupture of the Vessels, Varices, Aneurisms, Hæmorrhages, Stagnation of the Fluids, Corruption, Gangrene, Suppuration: And sometimes, as a necessary attendant upon these, Death. When the Head receives a considerable Contusion, the Senses are then taken away, the Limbs become either convulsed or rigid, and Death presently follows, in the Manner we have already explained, treating upon Wounds of the Head. If a violent Contusion falls upon the Thorax, a Difficulty of Breathing follows, with spitting of Blood, fainting Fits, Inflammation, and Ulcers of the Lungs, which usher in Death. After Contusions of the Abdomen you may expect vomiting of Blood, Inflammations, Suppurations, or Gangrene of the Viscera, and at length Death [a]. If any internal Vessel is burst by the Violence of a Blow, it is no Wonder if the Patient dies upon the Spot, though there be no Mark of Violence left upon the external Parts. Lastly, if the Eye is contused, Tumor and Inflammation will succeed, and frequently Loss of Sight.

How to discover the bruised Parts.

VII. Contusions may be examined, 1. By the Eye, when they are inflicted upon the external Parts of the Body: Tumors are formed, the injured Parts are discoloured, at first becoming red or black, then livid, yellow, green, and at last black again. If the Contusion is not very considerable, the Parts will of themselves recover their natural Colour. 2. When the Contusion is not within the Reach of the Eye, you must feel for it: An unnatural Softness of the Limb, or a Fluctuation of the extravasated Blood under your Fingers, will pretty clearly point out the injured Part to you. 3. Pains and Rigidity of the contused Part will make the same Discovery. Lastly, 4. You may form some Judgment of the Degree of the Injury received, from considering the Manner in which it was given, and the Size and Nature of the inflicting Instrument. You will judge what internal Parts are injured by the Symptoms which succeed, and by observing which of the Functions of the Body are disturbed or destroyed. If a Fracture attend the Contusion, it will easily be discovered by the Eye, the Touch, and the Ear.

[a] An Instance of this Kind happened in the Year 1726, at a Village near *Helmstadt*; a School Master there beat one of the Children very smartly, with a Stick of no great Size, but the Boy died in a few Days afterwards; upon opening him, the Viscera of the Abdomen appeared grievously bruised and lacerated. I opened another Boy soon afterwards, who was killed by a Blow, and found his Liver divided quite through the Middle, though there appeared no external Injury. Consult here the Quotation from BOHN, in the preceding Page. In the Year 1738, a Boy's Spleen was torn by the Kick of a Horse, and the Cavity of the Belly found full of Blood.

VIII. What we have ſaid above concerning the Nature and neceſſary Effects of Contuſions of each particular Part, will give the Surgeon great light in forming his Prognoſtic: Nevertheleſs, it will not be improper to ſubjoin a Rule or two in this Place. Slight Contuſions are attended with little or no Inconvenience or Danger, beſides diſcolouring the Skin: And even that Deformity is of a very ſhort Date; for the ſtagnating Blood is preſently licked up again, and the Spots vaniſh. But in larger Contuſions, where there is a great Collection of ſtagnating Blood in the muſcular Parts, an Abſceſs, Gangrene, or Sphacelus will eaſily follow. Contuſions of the internal Parts are extremely dangerous; and the Degree of Danger encreaſes in Proportion to the Violence of the Contuſion, and the Conſequence of the Part in performing the neceſſary Offices of Life. If inſtant Death does not happen in this Caſe, yet it is uſually attended with ſuch dangerous Inflammations, that the Patient conſumes away by Degrees, and very rarely eſcapes. Contuſions of the Bones, particularly of their *Medulla*, and of the Joints or Ligaments, are very dangerous, eſpecially thoſe which are inflicted by Gun-ſhot: But the Contuſion or Fracture of the *Cranium* from the Vicinity of the Brain, and of the Bones of the Thorax from their near Relation to the Heart and Lungs, exceeds the reſt in the miſchievous Conſequences which attend it, as we have largely enough explained above. Prognoſis.

IX. Your principal Care in the Cure of Contuſions ought to be to divide the inſpiſſated Fluids, and at the ſame Time to prevent the Parts from ſuppurating, and being affected with Gangrene. There are ſeveral Methods ſucceſsfully uſed for the Cure of ſlight Contuſions. For Example, when a Tumor ariſes in the Forehead from a Fall, which very frequently happens to Children, it will eaſily be cured by fomenting it *cum Vino calido, Spiritu Vini vel ſolo, vel camphorato, Aquâ Reginæ Hungariæ*; or by applying cold Water or Vinegar mixed with Salt to the Part; or by clapping a broad Piece of Money, or a Plate of milled Lead upon the Tumor, and faſtening it on with a very tight Bandage. Perſons of ſlender Circumſtances may find eaſier and cheaper Remedies; nor will they be baulked in their Expectations, if they apply Linen Rags dipped in freſh warm Urine to Tumors of this Kind. Cure of ſlight Contuſions.

X. Larger Contuſions may be dreſſed with Decoctions *ex Scordio, Sabinâ, Abrotano, vel ſeorſim vel junctim, in Vino, vel Aquâ ſalſâ*, repeating them warm with Linen Cloths, and with the medicated Bags. You will find great Benefit by applying a Sponge dipped *in Decocto Saponis Veneti in Urinâ recenti.* Your End alſo will be ſufficiently anſwered by Applications of *Spiritus Frumenti*, or *Aqua Calcis, cum admixto Spiritu Vini camphorato, vel Acetum Lithargyriſatum, item Acetum cum ſemine Carui coctum.* Theſe Remedies are all to be applied warm. Of larger Contuſions.

XI. When the Contuſion is ſo violent, that it is apparently impoſſible to divide the ſtagnating Fluids, and return them into the Circulation; and the Parts are haſtening to become Gangrene, you muſt ſcarify them without Delay, carefully avoiding the larger Trunks of the Veſſels. By this Means you will ſet the ſtagnating Fluids at Liberty, and prevent dangerous Conſequences, as Tumors and Inflammations, Suppuration and Gangrene: And the Cure will be eaſily effected. Of violent Contuſions.

XII. Having done this, you are in the next Place to apply proper Fomentations, or medicated Bags, made in the Manner we directed in *Chap.* XIV. What is farther to be done.

N. 10. or according to the following Preſcription. ℞. *Rad. Bryoniæ* ℥ij *vel* ℥iij. *Herbæ Sabinæ—Scordii—Abrotani, Arboris Vitæ, ſive Thuyæ vel Abſinthii ana, Mij. Singula iſta minutim diſſecantur, affuſiſque Vini circiter Libris duabus, per Horæ quadrantem probè decocta, per panniculum laneum procolantur. Dehinc Saponis Veneti vel Hiſpani aliquot Unciæ huic decocto probè calido admiſcentur, complicatique panniculi Lanei ex eodem expreſſi per ſingulas ferè Horas læſæ Corporis parti calidè ſuperinjiciuntur.* Rub the Tumor well with hot Cloths before you foment it, which will keep the Blood in its fluid State: Or, if it is already concreted, it will divide it, and make it fit to return into the Veſſels, or at leaſt to eſcape through the inviſible Pores of the Skin. If you cannot be ſupplied with Wine to make your Fomentation, you muſt uſe ſalt Water; which, if you are not near the Sea, you may make of common Water two Pints with the Addition of a handful of Salt. If any one is better pleaſed with the Form of a Cataplaſm, he may prepare a very cheap, and no leſs uſeful one in the following Manner. ℞. *Pulver. Radic. Bryoniæ, Saponis Veneti ana* ℥iij. *coq. in Aquæ recentis vel Aquæ ſalſæ q. ſ. ad Conſiſtentiam Cataplaſmatis.* This will have ſtill greater Efficacy if you add *Gummi Galbani vel Ammoniaci* ℥j. *in Vitell. Ov. q. ſ. ſolut.*

Of internal Remedies and a proper Diet.

XIII. Where the Contuſion is of any Conſequence, you ſhould never neglect the Adminiſtration of internal Medicines: And here your Intention is to promote the Diſcharge of Sweat and Urine, by preſcribing, dividing, and attenuating Decoctions and Infuſions to be drank plentifully. Theſe may be prepared *ex Theâ, Betonicâ, Veronicâ, Salviâ, Roriſmarino, Ligno Saſſafras, Herbâ Arnicâ. vel Petroſelini Radicibus.* The Efficacy of theſe Medicines in dividing inſpiſſated Fluids, is ſcarcely to be conceived, eſpecially if you now and then add to a Draught of one of theſe Infuſions a Drachm of *Venice* Soap. You will find no leſs Aſſiſtance from the *Pulvis ad Caſum, Auguſtanorum*, or from *Sperma Ceti, vel ſolum vel cum admixtis Sanguine Hirci, Mumiâ, Cancrorum Lapidibus, in Pulverem redact.* Theſe may be given to a Drachm at a Doſe, in a Draught of any of the former Infuſions. In plethoric Habits you ſhould never forget to open a Vein, and repeat it as often as you are threatened with an approaching Abſceſs or Gangrene: The Patient muſt abſtain from Fleſh and ſtrong Liquors, living wholly upon Broths and thin Spoon-meat.

What ſtill remains to be done.

XIV. The Fluids that were collected together by the Contuſion being pretty well diſperſed by the Methods we have recommended above, the remaining Part of the Cure that principally regards the Wound, (which frequently accompanies this Caſe) is eaſily performed, by filling it up with Pledgits ſpread with a digeſtive Medicine, and laying on a warm Plaſter over the Dreſſings: Which will ſave the Surgeon the Trouble of preparing Cataplaſms and Fomentations for this Purpoſe, and anſwer his End as well. The *Emplaſtra Diaſaponis, Diachylum, de Melito, de Spermate Ceti, de Galbano*, all anſwer this Intention, or if you pleaſe you may uſe the following ℞. *Empl. de Meliloto* ℥iv. *Galban. puri ſolut.* ℥ij. *Farin. Rad. Bryon.* ℥j. *Flor. Sulphur. Æthiop. min. ana* ℥ ß. *Ol. Chamæmel. q. ſ. M. f. Emplaſtrum.* In the mean Time the Regimen which we directed above, both with regard to Medicine and Diet, ſhould be ſtrictly obſerved. The moſt dangerous Contuſions are cured in this Manner, much eaſier than by Suppuration or Scarification. Having anſwered the Intention of diſperſing the ſtagnating Fluids, and cleanſing the Wound, nothing remains but

to

to forward the Union of it by Applications of the vulnerary Balſam, and at laſt dry Lint, as we have already adviſed for healing other Wounds.

How the Parts are to be treated when they ſuppurate.

XV. It ſometimes happens, when the contuſed Parts lie very deep, or the Surgeon is ignorant of his Buſineſs, or the Patient refuſes to ſubmit to proper Treatment, that the ſtagnating Fluids will corrupt and ſuppurate. When the Suppuration is begun, it muſt be forwarded, 1. By emollient Cataplaſms prepared *ex Rad. Malv. Althææ, Liliorum Alborum, Herbis Malvæ, Althææ, Parietariæ, Mercurialis, Brancæ Urſinæ, Meliloti, Verbaſci, Ficubus, Lini Semine, Fœnogræco, Farinis Variis, Micis Panis cum affuſo Aquâ vel Lacte coctis ad Pulticulam, Butyroque, Adipe, Oleiſve emollientibus, Lini ſcilicet, Chamæmelæ, Liliorumque Oleis dilut.* Theſe are to be applied to the Part as hot as they can be well born. 2. Sometimes in this Caſe it will be proper to mix warm Medicines with Emollients, ſuch as *Cepæ ſub Cineribus toſtæ, Fermentum Panis, varia Gummata, Galbanum ſcilicet, Ammoniacum, Bdellium, Opoponax in Vitell. Ovor. ſoluta.* Theſe are to be mixed with the emollient Ingredients which we enumerated above. For Example, ℞. *Herbæ Malvæ, Althææ, Parietariæ, Meliloti ana M*i. *conciſa coquantur in Aquâ ſimplici q. ſ. adde Conſiſtentiam Cataplaſmatis. Adde Ceparum ſub Cineribus Aſſatarum,* ℥iv. *Galbani, Vitell. Ov. ſolut.* ℥ii, *Ol. Lilior. Albor.* ℥iſs, *Farinæ Sem. Lini q. ſ. ad Conſiſtentiam.* Theſe Applications are to be repeated till the Suppuration is thoroughly formed. In ſmall Contuſions the *Emplaſtrum Diachylon cum Gumm.* will ſufficiently anſwer this Intention.

How the Matter is to be diſcharged.

XVI. When the Whiteneſs and Softneſs of the Tumor evidently diſcover that the Matter is thoroughly formed, and fit to be diſcharged, you may lay open the Part with your Knife, and afterwards digeſt and heal the Wound in the ſame Manner as we have frequently directed above. If it breaks of itſelf, it ſhould be treated in the ſame Manner. Where the Aperture is too ſmall, it muſt be enlarged with your Knife, that it may be eaſier cleanſed, and more conveniently healed.

How a Gangrene and Sphacelus are to be treated.

XVII. Large Contuſions are ſometimes attended with violent Inflammation or Gangrene; in this Caſe make frequent and deep Inciſions upon the Part, and dreſs the Wounds *cum Theriacâ Spiritu Vini Camphorato dilut.* applying warm Fomentations externally, not omitting the internal Medicines preſcribed at *N.* XIII. (but I ſhall treat more largely upon this Head in *a Chapter upon Gangrene and Sphacelus.*) When a Sphacelus is begun, if it is only in the common Integuments, you muſt apply Scarification, a digeſtive Ointment, Medicines that reſiſt Gangrene, and Suppuration. But if the whole is ſphacelated, that is, entirely corrupted and mortified, the Limb muſt be entirely taken off, in the Manner we ſhall ſhew you when we come to deſcribe *Chirurgical Operations.*

Cure of internal Contuſions.

XVIII. When the internal Parts are contuſed, unleſs the Patient has immediate Aſſiſtance, Inflammations, Suppuration, and Gangrene inſtantly enſue; which ſoon terminate in Death. Therefore, in theſe Caſes, the Surgeon ſhould endeavour to dilate and attenuate the concreted Blood with the utmoſt Expedition, by frequent Blood-letting, by gentle opening Medicines and Clyſters, *Chap.* XIII, *N.* XXXVII, by preſcribing the warm Decoctions and Infuſions which we directed above at *N.* XIII. If the Diſeaſe is curable, theſe Methods will prevent Suppuration or Mortification. Theſe Parts do not admit of Inciſion, and the Uſe of abſorbent Powders, ſuch as *Lapides Cancrorum, Sanguis Hirci, Cornu Cervi,*

Carvi, *Pulvis ad Casum*, and the like, is trifling in this Case. We have already sufficiently explained how Contusions of the Head in particular ought to be treated, in the preceding Chapter. But in Contusions of the Breast, or the Belly, you can direct nothing better externally than a Compress, steeped in Spirit of Wine camphorated, or a Bladder filled with warm Milk, in which the Flowers of Chamomile or Alder have been boiled. Apply these continually warm to the Part affected. For further Applications, consult the Method laid down for the Treatment of Wounds in these Parts.

Contusions of the Eye.

XIX. When the Eye, that most noble and beneficial Organ, is contused by any Accident, it will swell immediately, and be entirely deprived of Sight, except the Contusion is very small, and proper Remedies are instantly and carefully applied. If the Eye therefore has received a slight Contusion, you may wash it frequently, for the first Day, with cold Spring Water, covering it with Linen Rags, wet with the same: On the next Day, rub it externally *cum Spiritu Vini camphorato*, covering it with Stuphs wrung out of vinous Decoctions *ex Euphrasiâ*, *Veronicâ*, *Hyssopo*, *Salviâ*, *Florib. Chamæmel. & Semin. Fœnicul.* If you cannot get these Herbs, you may apply Bolsters, dipped in *Vino calido*, renewing them often. If the Contusion is large, or the Patient of a plethoric Habit, you should open a Vien. *On Bloodshot Eyes, see* CELSUS, *pag.* 369.

Of violent Contusions of the Eye.

XX. If the Contusion of the Eye is so violent, that you can plainly see the extravasated Blood through the *Cornea*, and all Objects appear red to the Patient, open a Vein either in the Foot or Neck, as you shall think most convenient, and repeat it, if necessary: Foment the Eye with Stuphs wrung out of the Decoctions which we prescribed above, and order him to bathe his Feet in warm Water two or three times in a Day, advising him also to observe the same Regimen with regard to Diet and internal Medicine, which we described at *N.* XIII. By the strict Observation of these Rules he will recover his Sight, if the Disorder be not become desperate, especially if you frequently drop warm Pigeon's Blood into the Eye. If these Attempts to disperse the stagnating Blood are frustrated, you may very probably succeed by making an Opening in the *Cornea* with your Lancet. The Manner of doing this to Advantage you will find described in *Chap.* LX. and LXI. of the *Second Part* of this Work, which treats professedly of *Operations*.

CHAP. XVI.

Of VENOMOUS WOUNDS, *and those that are made by the* BITES OF ANIMALS.

Poisonous Wounds are difficult to distinguish.

I. WE are informed by antient Tradition, that the *Indians*, and the barbarous Nations all over *Africa*, used to poison their warlike Weapons, to aggravate the Wound, and destroy their Enemies with greater Certainty; which some of them continue to this Day. This Custom has long ago been laid aside by the *Europeans*, as inhuman. Wounds that are inflicted by Weapons of this Kind, are attended with extreme Danger: For, as this Sort of Mischief is in a great Measure concealed and unexpected, there is no Room to make

make uſe of proper Precautions to prevent or remedy the Evils that will enſue from it.

II. For though ſeveral *Phyſicians* and *Surgeons* have aſſerted, that you may diſtinguiſh Wounds made by a poiſonous Weapon, not only by the filthy Stench of the wounded Parts, and the unuſual Colour of the Diſcharge that proceeds from them, to wit, yellow, green, livid, and black; but particularly by the Increaſe of Pain, by the extravagant Degree of Tumor and Inflammation that they are attended with; Palpitation of the Heart, Swooning, Spaſms, Diſtortion, or Rigidity of the Limbs, cold Sweats and Shiverings, with which the Patient is conſtantly afflicted in this Caſe. Nevertheleſs, if I may be allowed to judge, I muſt determine theſe Symptoms to be altogether doubtful and uncertain. For what Surgeon does not know, that all theſe Symptoms may be brought on either by the bad Habit of the Patient, or from the Nature of the wounded Part, if it is nervous or tendinous; or, in a word, from an hundred other Cauſes, where Poiſon is no ways concerned? For the Marks of them are very uncertain.

III. You have much greater Certainty of a Mixture of Venom in the Wound, when it is made by the Bite of a *venomous* or *mad Animal*, (for there is ſcarce any Species of Animals but what is at ſome times ſubject to Madneſs) eſpecially of a Dog, a Cat, a Wolf, an Ape, a Man, a Serpent, a Scorpion, or of any other venomous Inſect. But ſince the Coldneſs of our Climate renders us very rarely ſubject to Injuries from the Bites of venomous Serpents, or indeed of any other venomous animal but a *mad Dog*, it will be moſt to our Purpoſe to treat chiefly of that Subject; at the ſame time not entirely neglecting the Deſcription of other Wounds inflicted by Biting. And firſt we ſhall ſpeak of the Bites of Animals which are not mad. Of Bites.

IV. Bites of enraged Animals are attended with very grievous Conſequences, though they are not afflicted with Madneſs. [a] CELSUS has long ago taught us, that the Bites of a [b] Man, an Ape, a Cat, a Dog, or of any wild Beaſt or other Animal, frequently bring on terrible Miſchief. In that Paſſage of his where he ſays, *Omnis* [c] *ferè morſus quoddam virus habet*, "Almoſt all Bites whatever have "ſomething poiſonous in them." He is not to be underſtood as if he had aſſerted, that all Wounds, made by Bites, have actually ſome Particles of Poiſon, properly ſo called, inſtilled into them; but rather as ſpeaking of the bad Symptoms which muſt neceſſarily enſue from the violent Laceration and Contuſion of the Muſcles, Nerves, Tendons, Ligaments, and Bones, by the Bite of a large Dog, a Horſe, a Wolf, or a Bear, or any other large Animal. If the Wound is ſlight, encourage the Diſcharge of Blood from the Part, by preſſing it with your Bites of Animals which are not mad.

[a] *Lib.* v. *Cap.* 27. *N.* 1.

[b] PANAROLI *Pentec.* 2. *Obſ.* 42. HILDANI *Cent.* I. *Obſ.* 84, & 85. *ac De morſu equi*, ibid. *Cent.* II. *Obſ.* 86. SEREN. SUMMONIC. *Cap. De hominis & ſimiæ morſu.*

[c] In ſeveral Editions of CELSUS you will find FERÆ for FERE, *Omnis autem* FERÆ *morſus quoddam virus habet*; but I think the other Reading preferable to this; for CELSUS does not treat in this Place of the Bites of wild Beaſts alone, for they are very uncommon Caſes, but of the Bites of a Man, an Ape, and particularly of a Dog, (which Animals he manifeſtly diſtinguiſhes in this Place from wild Beaſts) which Bites he deſcribes as bringing on violent Miſchiefs, eſpecially if the Animal is much enraged. Therefore CELSUS very properly, in an extenſive Senſe, declares, *Omnem* FERE *morſum habere quoddam Virus, ſive Venenum*; which Opinion is not applicable to wild Beaſts alone, but to all Animals whatever, for Reaſons which we ſhall preſently lay down. MORGAGNI is of the ſame Opinion with me concerning the Interpretation of this Paſſage, which he explains, according to his uſual Cuſtom, with great Learning and Perſpicuity. *In Epiſtol. in* CELSUM, *pag.* 126.

Fingers,

Fingers, ſucking it with your Mouth, or by the Application of Cupping-glaſſes, or by enlarging the Wound with a Lancet: Waſh it afterwards with warm Wine, or camphorated Spirits of Wine, and apply Bolſters to it dipped in the ſame Liquor, repeating it every three or four Hours till all Danger of Inflammation is gone off. CELSUS recommends Salt, as the beſt Remedy for the Bite of a Dog, if it is applied dry, and well rubbed in. It is afterwards to be healed with the Oil of Turpentine, or ſome vulnerary Balſam. If the Wound is very conſiderable, it will be abſolutely neceſſary to enlarge it with the Knife, unleſs the Opening is already very large. The Diſcharge of Blood alſo ſhould be encouraged in this Caſe, by the ſame Methods which we adviſed in the foregoing; and you ſhould open a Vein to prevent a dangerous Inflammation. I lately ſaw the bad Effects of a Neglect of this Practice, in the Caſe of a Boy who was bit by a Dog near the Knee, and was ſeized with a violent Inflammation over the whole Leg and Thigh, for want of a proper Evacuation of Blood. The Wound ſhould be diligently waſhed with Wine, warm Spirits of Wine, or ſalt Water, dreſſing it up with Lint and Linen Bolſters wet with the ſame Liquors: Theſe Dreſſings are to be repeated frequently every Day, to prevent a violent Inflammation. You may dreſs afterwards with Honey, or a digeſtive Ointment, and heal with a vulnerary Balſam, as in other Wounds.

How to know a mad Dog.

V. In order to know whether your Patient has been bit by a mad Dog, it is neceſſary that we ſhould firſt ſettle the Marks by which a mad Dog is diſtinguiſhable from other Dogs. When a Dog is mad, he foams at the Mouth, and lolls out his Tongue, claps his Tail betwixt his Legs, and runs up and down without ceaſing, as if he was purſued; he makes a hoarſe Noiſe when he barks, and is afraid of all Animals that come in his Way, ſnapping at every thing he meets, even at his own Maſter, upon whom he uſed to fawn: Other Dogs are afraid of him, and avoid him.

Miſchiefs that enſue from the Bite of a mad Dog.

VI. Men that are bit by a mad Dog are uſually afflicted with grievous Diſorders, ſometimes ſooner, ſometimes later, in Proportion to the Malignity of the Poiſon that is imbibed by the Wound, and to the Patient's Habit of Body at the time he receives the Bite. When once the Poiſon begins to exert itſelf, the Patient is ſeized with great Anguiſh, continual Groanings, Sighing, acute Pains, and Fevers.

Prognoſis.

VII. If nothing is done to relieve this Diſorder, he is ſeized with a *Hydrophobia* about the ninth Day, a miſerable Circumſtance! ſince he is continually afflicted with Thirſt, and at the ſame time labours under ſuch a Dread of all Fluids, that he durſt not ſatisfy it, but rages and foams like a Dog, till being quite ſpent, he [a] expires. Therefore in this Caſe it well behoves us to be early in our Applications to Wounds of this Kind; for when the *Hydrophobia* appears, nothing is to be looked for but certain Death [b].

How the Wound is to be treated.

VIII. Where ſhall we find a Remedy for this dreadful Diſorder? Many are of Opinion, that to puſh a Man unawares into a Pond or River is a certain Cure;

[a] There have been ſeveral Inſtances where the Poiſon has lain dormant in the Blood for one, two, nay for ſeveral Years, and has at length broke out, and carried off the Patient after the uſual Manner. WEBSTER has given us ſeveral ſurpriſing Relations of this Kind in his Book *De Magiâ*.

[b] It will be worth your while to conſult VERDRIES upon this Subject, *in Lib. De æquilibrio ment. & corpor. circa finem.* And MARESCOTTUS *De Variolis, pag.* 57. where he treats of the *Hydrophobia.*

this

this was a common Remedy in the Times of CELSUS, *Lib.* V. *Chap.* 27. Some think it ſufficient to bathe the wounded Limb frequently in cold Water for ſeveral Days together, and to dreſs the Wound with ſome of the mad Dog's Hair: They imagine this laſt Method cures a Man by *Sympathy*, as they affect to call it. Others, as CELSUS adviſes, throw the Patient into Water when the *Hydrophobia* is coming on, and endeavour to force him to drink againſt his Will; for by this Means, they aſſert, that they take off his Thirſt, and the Dread of Water at the ſame time. On the other hand, almoſt all the moſt experienced Surgeons recommend the following Method as the ſafeſt and moſt worthy to be tried: To enlarge the Wound with the Knife, to promote the Flux of Blood, to cleanſe it *cum Aquâ ſalſâ*, *vel cum Aceto*, *vel Spiritu Vini & Theriacâ*, and to endeavour to draw out the Poiſon by Cupping-glaſſes: And, laſtly, if the Texture of the Part will permit it, that is, when only the common Integuments or fleſhy Parts are wounded, they apply the actual Cautery to the Wound, and dreſs it afterwards like other Burns. But if the Part affected will not admit of the Cautery, the Wound muſt be enlarged by Inciſion, then dreſſed with Vinegar and Treacle, and covered with a Bolſter dipped in the ſame Ingredients: And to prevent Inflammations and a conſequent Fever, a Vein ſhould be opened (eſpecially in plethoric Habits) agreeable to the Practice of the Antients. *See* CELSUS, *Lib.* V. *Cap.* 27. *N.* 2. AQUAPENDENS, *in Operat. Chirurg. pag.* 331. adviſes this Method to be uſed to all Wounds that are infected with Poiſon: But in theſe laſt Caſes you ſhould firſt diligently enquire, whether the Arrow or other Weapon, by which the Wound was inflicted, was poiſoned or not, or whether the Violence of the Symptoms give you ſufficient Reaſon for ſuch Conjecture. For where it remains doubtful whether the Weapon was poiſoned or not, you ſhould deal more tenderly with your Patient, and not proceed to the Uſe of the actual Cautery, but treat the Wound after the Method juſt deſcribed.

IX. KOEMPFER, who was one of the chief Phyſicians in the *Eaſtern* Countries, and well verſed in the Nature of the venomous Serpents, with which that Part of the World abounds, tells us in his *Amœnitat. Exotic. pag.* 581. and in his *Itiner. in Chinam & Japan*, that he has frequently cured the Bites of theſe Animals without the Help of the Cautery, by making a Ligature upon the Limb above the injured Part, and ſcarifying the Wound, anointing it well afterwards *cum Theriacâ*, and covering it with a Cataplaſm made of the ſame Medicine, giving alſo a Doſe of it frequently by way of Sudorific. He declares, that he never loſt a Patient, where he had an Opportunity to treat him in this Method. As this is a ſimple, eaſy Method, and proves by Experience to be a very ſafe one, I ſee no Reaſon why we ſhould not prefer it to one attended with great Cruelty and Pain in the Operation. Yet this Method may be found leſs effectual in curing the Bites of *European* Serpents. Kœmpfer's Method of curing the Bites of Serpents.

X. Some anoint the Wound with the *Oleum Nucis Moſchatæ* inſtead of the *Theriaca*. Others apply *a Toad* to the Part, either alive, or dried and ſoftened with Vinegar, imagining that this Animal has a ſpecific Virtue in extracting Poiſon from a Wound. Others again are extremely fond of the *Ophites*, or ſerpentine Stone, called *Pedro del Cobra*, which they are told is found in ſome Species of Serpents in the *Indies*. They affirm, that if you lay this Stone upon a Wound made by the Teeth of a venomous Serpent, or Viper, it will imbibe all the Poiſon, and if you afterwards ſoak it in Milk, it will depoſit it in that Fluid. Com- Other Methods.

pare with this Place, KOEMPFER, *in Amœnitat. Exotic. pag.* 57, *& ſeq.* though he only adviſes it *contra Serpentum ictus*; but the celebrated VALLISNERIUS, in his Book *De Generatione*, *p.* 141. denies that it is equal to the Cure of a Bite from an *Italian* Viper; therefore, I think, very little Credit is to be given to it. The following Cataplaſm is in great Reputation with ſome for this Intention, ℞. *Cepæ ſub Cineribus aſſatæ, & Allii Bulbum unum, Theriacæ, Fermenti Panis Valentiſſimi ana* ℥j. *Sinapi* ℥ß *quæ ſingula infuſo aceto calido in formam Cataplaſmatis probe conteruntur, Vulnerique ſuperimponuntur.* Dr. MEAD recommends Viper Fat as a certain Remedy for the Bite of a Viper: And ſince that, Olive Oil has been in the higheſt Eſteem.

The reſt of the Cure.

XI. In a Day or two after your Patient has been bit by a mad Dog, the Wound ſhould be dreſſed *cum Melle vel Unguento digeſtivo admiſt. Ung. Ægyptiaco, vel Mercurio Præcipitato Rubro bis quotidie.* It may be kept open with theſe Dreſſings for ſome Weeks, or for about forty Days, till the Poiſon is thoroughly diſcharged. You ſhould always be very careful not to heal Wounds of this Kind too ſoon, eſpecially where they have not been cauteriſed; for the principal Part of the Cure in theſe Wounds conſiſts in keeping the Part open, and encouraging a Diſcharge: Wherefore CELSUS always recommends very ſtimulating Medicines.

The internal Method.

XII. Beſides the external Remedies that we have adviſed, it will be proper to preſcribe ſtrengthening Medicines and Sudorifics to be given internally, according to the Strength of the Patient. Some of the Antients, according to CELSUS, put the Patient into a warm Bath, and ſweated him there as long as he could bear it, with the Wound uncovered, that the Poiſon might diſtil out in greater Quantities, waſhing it well afterwards with Wine, which is an Enemy to all Poiſons. When they had repeated this Proceſs for three Days, they thought him out of all Danger. It would be very convenient in this Caſe to give him now and then a Glaſs of Wine inwardly, and a Spoonful or two of good Wine-Vinegar, in which ſome Sage had been boiled, with a Drachm of *Theriaca* in it; and between whiles to adminiſter Draughts of *Infuſum Scordii vel Salviæ in Aquâ calidâ*, putting the Patient into a warm Bed, or into a Bath, to encourage him to ſweat largely: This ſhould be done for ſeveral Days ſucceſſively. You may give, for ſeveral Mornings, *Valerianæ Radicis* ℥j. in the room of *Theriaca*, which I find is much the Practice in *Italy*; or *Radix Gentianæ*, in the ſame Quantity, with a Draught of one of the Infuſions which we juſt now preſcribed. Some, after the Example of GALEN and BOYLE, inſtead of *Theriaca*, give *Sal volatile Viperarum, vel ex Cancro Fluviatili combuſto paratum*, which they have ſo great an Opinion of, that they venture to affirm it to be *an infallible Specific* in this Caſe.

XIII. Several amongſt the Moderns recommend the *Scarabæus Maialis melle conditus & tritus, vel Scarabæi Succus*, which they ſuppoſe to have very great Efficacy in deſtroying Poiſon, and preventing its bad Effects, if it be repeated for ſome Days. Others have no leſs Opinion of the Virtues of the Heart, Liver, or Brain of a mad Dog or Wolf, which they affirm to have very ſalutary Effects, if given to the Patient in Time; but for many Reaſons I think this by no means a juſtifiable Practice. PARÆUS directs *Garlic* to be given frequently. But I think the moderate Uſe of ſome generous Wine, and the Juice of Citrons and mild acid Fruits, or Wine-Vinegar, either ſimple, or mixed with Honey, will be

of

of great Service, not only in ſtrengthening the Patient, but in deſtroying the Poiſon.

XIV. The ſame Methods of Cure which we adviſed above, *N.* VIII, *and* XIII, will be ſerviceable againſt the Stings of *Scorpions*, or other venomous Animals. The Scorpion affords an eaſy Remedy againſt his own Sting; for ſome bruiſe him and lay him upon the Wound; others drink him in a Glaſs of Wine. *See* CELSUS, *Lib.* V. *Cap.* 27. *N.* 3. where he ſays, *Venenum Serpentis non guſtu, ſed in vulnere nocet.* Some dreſs the injured Part with Oil of Scorpions, which they eſteem a ſure Method of Cure. Others do nothing but draw Blood from the Arm. The Antients in this Caſe hired Men to ſuck the Blood and Poiſon out of the Wound, which they did, ſpitting it out again, without injuring themſelves in the leaſt. See the above cited Paſſage from CELSUS: But the Patient at the ſame time did not neglect the Uſe of the Methods which we preſcribed above, both with regard to internal and external Medicines and Applications. The beſt Cure for the *Sting of Bees* or *Waſps* is, *Acetum cum Theriacâ*, or *Theriaca cum Spiritu Vini*, or *Bolus Armena cum Aceto.* The Method of Curing a Gangrene ariſing from the Bite of a Horſe, may be ſeen in HILDANUS, *Cent.* ii. *Obſ.* 86.

INSTITUTIONS OF SURGERY.

PART II. BOOK II.

Of FRACTURES.

CHAP. I.

Of FRACTURES *in general.*

Fractures, what.

I. UNDER the Name of *Fracture*, ſpeaking in general Terms, we conceive every Solution of Continuity in the Bone, either from an internal or an external Cauſe, whether the external Cauſe was a ſharp or blunt Inſtrument. But as we uſually call thoſe Injuries of the Bone that are brought on by acute Inſtruments *Wounds of the Bone*, ſo we properly call thoſe *Fractures of the Bone*, where the Bone is broken by the Force of a blunt Inſtrument. Therefore Fractures generally happen when any Part of the Body where a Bone is ſituated receives a violent Shock, either by a Fall, by Jumping, or a Blow with a Piece of Timber, a Stone, or by a Shot from a Gun. There are alſo Inſtances where this Accident has happened from an internal Diſorder, to wit, from the Scurvy, a Caries, or the Venereal Diſeaſe, which have rendered the Subſtance of a Bone ſo brittle, that it has been fractured without any apparent external Accident. *See* CELSUS, *L.* viii. *C.* 1. MARCELL. DONATUS *Hiſt. Med. L.* iv. *C.* 5. *ex* PANDOLPHINO, *p.* 272. CONNOR, *Diſſ. Med. Phyſ. de ſtupendo Oſſium coalitu, pag.* 11. *Fractura Oſſium a Cauſâ internâ mirabilis.* SAVIARD, *Obſ.* LXII. HEYNE *De Oſſium Morbis, N.* XXIX.

Different Species of Fractures.

II. We may diſtinguiſh Fractures into ſeveral Claſſes or Species. Firſt, every Fracture is either *ſimple*, that is, when no other Parts beſide the Bone are injured; or *compound*, that is, when you have at the ſame time a Wound, a Diſlocation, Hæmorrhage, Inflammation, Fever, Caries, or Contuſion of the Bone; or where the Bone appears to be fractured in ſeveral Places, or more than one Bone, at the ſame time. Other Differences ariſe with regard to the Situation of the Fracture: Sometimes it happens in the Cranium, Ribs, Clavicles, Vertebræ; ſometimes in the upper or lower Limbs; ſometimes in the Middle of the Bone; ſometimes in either of the Extremities. Again, ſome

Fractures

Fractures are tranſverſe, others oblique; in which Caſe it frequently happens that the Points of the Bones wound the neighbouring Parts, puſhing quite through the muſcular Fleſh and common Integuments, or at leaſt pricking them grievouſly, and bringing on Pain, Inflammation, Tumor, and Spaſms. Violent Contuſions alſo may be claſſed under the Head of Fractures; for the Bones in this Caſe are frequently broke into Splinters by the falling of any heavy Body upon the Part, or by Fire-arms, or the Preſſure of Mill-wheels, or the Wheels of Carriages.

III. To Fractures of the Bones we may very properly add *Fiſſures*, when the Bones are divided either tranſverſely or longitudinally, not quite through, but cracked after the Manner of Glaſs, by any external Force: For although moſt Surgeons have looked upon the mention of Fiſſures as an idle Jeſt, eſpecially of thoſe that are ſaid to be made in a longitudinal Direction, and others have paſſed them over ſilently in their Writings, or where they have by Chance been mentioned, no Method of Cure has been directed for them: Yet there is not one of them that I know of, who was ever able to demonſtrate the Impoſſibility of theſe Fiſſures; ſince they often happen in the *Cranium*, and indeed in other Bones. All they can pretend to alledge is, that they have never fallen under their Obſervation; but I find Inſtances of this Kind of Diſorder, with a Method of Cure deſcribed for it, in Authors of undoubted Credit. *See* HEYNE *De Morbis Oſſium, N.* XXIX. and particularly that famous *German* Surgeon FELIX WURTZIUS, *in Chirurg. Part* II. *Cap.* 28. which makes me ſo far from calling the Fact in queſtion, that I think it ought rather to be a Spur to a young Surgeon to conſider well the Marks that WURTZIUS has deſcribed, and to make a more diligent Search after Caſes of this Kind, than has hitherto been made. We ſhall ſpeak more largely to this below. Of Fiſſures in the Bones.

IV. It is no difficult Matter to examine *Fractures of the Bones*, 1. *By the Eye*, when the Pieces appear through the Skin, when the injured Part is apparently ſhorter than the ſound, or when you ſee that the Patient cannot make Uſe of it. 2. *By the Touch*, when you perceive a præternatural Inequality of the Bone, or that it bends in a Part where Nature never intended it ſhould; and here, by the way, we muſt recommend it to the Surgeon, if it be poſſible, to fix the Patient immediately, at the firſt ſearching of the Fracture, where he is to lie, during the Courſe of the Cure. 3. *By the Ear*, when we hear the Ends of the broken Bones cruſh againſt each other upon moving the Limb. But, 4. We may ſtrongly ſuſpect a Fracture of the Part, when it has received a Blow with great Violence from a heavy Body. And, 5. We ſhould not neglect to obſerve, that the Parts are more ſubject to this Injury in Winter, than in Summer. Laſtly, 6. Sometimes, particularly in Fractures that are made in a tranſverſe Direction, the broken Parts of the Bone will immediately of themſelves recover their natural Situation, and leave very little room to ſuſpect the Diſorder. Therefore it is neceſſary to be very cautious and prudent in forming your Judgment in Caſes of this Kind. If your Patient has entirely loſt the Power of moving any Limb, or puts it in Action with the greateſt Difficulty, after having received a violent Blow upon that Part; or if he feels violent Pain when you handle it, or move it for him, this affords great Reaſon to ſuſpect a Fracture. But to make yourſelf more certain in this Caſe, it will be proper to take hold of the injured Limb with both your Hands, and ordering an Aſſiſtant at the ſame How Fractures are to be diſcovered.

ſame time to move it about, attend diligently whether you cannot hear the broken Ends of the Bone rub againſt each other, and obſerve whether you cannot diſcover a præternatural Dent or ſinking in any Part of the Limb. The Motion that your Aſſiſtant makes ſhould be done with great Care and Tenderneſs.

How to diſcover Fiſſures.

V. *Fiſſures in the Bones* are not eaſily detected; ſince neither your Senſes of Seeing, Feeling, or Hearing can give you Light enough to determine any thing with Certainty in this Caſe: And this ſeems to be the Reaſon why moſt Surgeons are deceived in this Caſe, as GOVEIUS well obſerves in his *Chirurgie veritable, pag.* 79. If we will believe thoſe Authors, who declare to us, upon their own Experience, that theſe Caſes ſometimes happen, we ſhall find there are ſufficient Signs to diſcover a Fiſſure of the Bone. They always ſuppoſe a Fiſſure when you have ſuch violent Pains after any external Violence, that the injured Part will not bear handling, and cannot ſupport the Parts above it; when you have more than ordinary Tumor, and theſe Symptoms do not yield to the uſual Applications. After this you are to expect violent Inflammations, Suppurations, Fiſtulæ, and Caries. Theſe Authors are of Opinion, that aged Perſons are moſt ſubject to this Diſorder, becauſe their Bones are very brittle. When we conſider the Nature of a Fiſſure, we ſhall not be long in gueſſing whence all the bad Symptoms attending it can ariſe: For the Bone being once cracked, the Blood and Sanies which fills up the Vacancy will preſently putrify and corrupt the Medulla, the neighbouring Parts, and at laſt the Bone itſelf, which will eaſily produce the Miſchiefs we have deſcribed.

Diſorders attending a fractured Bone.

VI. Great variety of Miſchiefs attend a fractured Bone; which differ, 1. With regard to the injured Part, and the Nature and Diſpoſition of the neighbouring Parts. 2. With regard to the Manner in which the Fracture is made; for oblique Fractures, and thoſe whoſe Splinters or Points wound and vellicate the neighbouring Parts, are much more painful and dangerous than tranſverſe Fractures. Fiſſures are attended with more or leſs Danger in Proportion to their Size, as appears from what we have delivered above. But, 3. We may judge of the Miſchief that is likely to attend a Fracture, from the Number of Pieces into which the Bone is broken. And, 4. By obſerving whether the Fracture happens in the Middle of the Bone, or at either of its Extremities. The principal Inconveniencies that attend a Fracture, are theſe: The Patient loſes the Uſe of the Limb, the lower Part of the Limb will be contracted by the Muſcles, which will make it appear diſtorted and deformed. The Laceration of the *Perioſteum*, and the Veſſels of the *Medulla*, bring in great Danger of Fiſtulæ and Caries. When the Nerves are pricked and irritated by Splinters or Points of the broken Bone, the Patient ſuffers great Pain, Convulſions, Inflammation, and Fever. If any Veſſels ſuffer Preſſure, the Circulation of the Blood is retarded: Therefore no Wonder if Inflammations, Abſceſſes, Gangrene, and Death, are the Conſequences: If the Preſſure is upon a Nerve, the Part to which it was determined becomes Paralytic, loſing both Senſe and Motion, and by Degrees uſually waſtes. Sometimes, whilſt the Bone is uniting, the broken Parts are ſupplied in too plentiful a Manner with Juices, and the Callus is formed irregularly, which occaſions Deformity in the Limb. When you have a Wound in the fleſhy Parts in Conjunction with a Fracture in the Bone, you will moſt likely be troubled with a violent Hæmorrhage: When the Blood-veſſels are injured, the Skin remaining ſound and unhurt, great Effuſions of Blood, and dange-

dangerous Swelling and Suppurations, are the general and almoſt inevitable Conſequence.

VII. The Surgeon ought to be very cautious in delivering his Prognoſtic concerning Fractures. He ſhould avoid being too haſty in promiſing a quick, eaſy, and certain Cure, leſt his Art ſhould be overcome by accidental Diſorders, and he be accuſed of Knavery or Ignorance. For I don't know how it happens, the moſt unſkilful Perſons in Surgery ſpeak of fractured Bones, as Caſes of the leaſt Importance, and make nothing of promiſing a Cure: Whereas it is undoubtedly true, that it is ſometimes impoſſible to reſtore a broken Limb to its former Shape and Strength, though your Surgeon is perfectly Maſter of his Art. Therefore ſince Fractures are ſometimes cured eaſily, but at other Times are attended with the worſt of Conſequences, it will be an Argument of Diſcretion in a Surgeon to deliver his Prognoſtic in ſuch a Manner, that it may not regard the fractured Part alone, but may give Warning alſo of the Accidents that are likely to happen to the neighbouring Parts, or which may be occaſioned by the Age, or the bad Habit of Body of the Patient, or by any other Circumſtances: And in this he ſhould always take Care not to be over haſty. Prognoſis in general.

VIII. I would recommend the following Obſervations to the Surgeon. 1. Simple Fractures, when you are called ſoon after the Accident, are much eaſier cured than Fractures that are complicate with an external Wound, a Diſlocation, a great Contuſion, an Hæmorrhage, a Caries, or with any other grievous Diſorders. 2. Fractures are more eaſy or difficult of Cure, according to the Part on which they happen. Thus ſmall Bones, ſuch as the Clavicles or Ribs, or the Bones of the Fingers, are uſally cured in twenty Days; the Radius, or Cubitus, in thirty; whereas the Os Humeri, or the Tibia, require from thirty to fifty Days; and the Os Femoris does not thoroughly unite till the ſixtieth or ſeventieth Day. 3. Men of good Conſtitutions, and in the Prime of Life, are cured ſooner, with leſs Trouble, than Perſons of a bad Habit of Body, or advanced in Years. In particular.

IX. Where the Situation of the Bone is not altered by the Fracture, or the broken Parts ſtart very little, they are much eaſier replaced, than where they are entirely ſeparated from each other, and a great Space intervenes between them. Tranſverſe Fractures admit of an eaſier Cure than oblique Ones. Fractures near the Articulations are attended with worſe Conſequences than thoſe which are made above the Middle of the Bone: For where the Fracture happens near either Extremity of the Bone, the Joint frequently ſuffers, which occaſions Loſs of Motion in the Part, the Ligaments alſo and Tendons are uſually bruiſed in this Caſe; from whence ariſe violent Pains, Inflammations, and Convulſions, and ſometimes even Gangrene, and Death itſelf; or at beſt, the Patient muſt ſubmit to an Amputation.

X. When two Bones of the ſame Limb are fractured, the Cure is more difficult than when this Accident happens only to one of them. When the Bone is broken into ſeveral Pieces, the Patient will ſeldom eſcape Abſceſſes, or even Gangrene or Sphacelus; that either the Limb muſt be taken off, or Death will enſue. At leaſt the Cure will require a great deal of Time, and the Limb will never entirely recover its Shape. Therefore where a Surgeon ſees this, he ought always to forewarn the Patient, or his Relations, what Danger he apprehends.

XI. Where the broken Bones are inſtantly reduced, your Cure will be performed with greater Eaſe, than where they have been for ſome Time ſeparated.

Therefore where the Surgeon is called a conſiderable Time after the Fracture has been made, he cannot promiſe to reduce the Bones eaſily, or to make a ſpeedy Cure.

XII. When any Parts of great Conſequence to the animal Œconomy are ſituated in the Neighbourhood of the Fracture, the Caſe will certainly be attended with great Danger, if not with Death. Such are Fractures of the Cranium, from Vicinity of the Brain; of the Vertebræ, from the Medulla Spinalis; of the Ribs or Sternum, the Oſſa Ilei and Pubis, from the Situation of the Viſcera of the Thorax, and Abdomen. Fractures alſo of the Bones to which the larger Arteries or Veins are connected, are very dangerous; more particularly when any Splinter or Point of the broken Bone vellicates or wounds a large Veſſel: For very violent, if not mortal Hæmorrhages muſt neceſſarily enſue, eſpecially when this happens in the Axilla or Groin, which is often the Caſe.

XIII. When the Ends of the fractured Bone break through the Muſcles and common Integuments, you will find great Difficulty in reducing the Bone to its proper Situation, from the great Number of Muſcles, Nerves, and Blood-veſſels that lie in the Way: The Laceration of which will bring on great Miſchiefs, and frequently Deformity and Weakneſs upon the Limbs, eſpecially if it is the Os Humeri, Tibia, or Femur, ſo as to render the Amputation of it neceſſary.

XIV. The moſt temperate Air and Seaſon of the Year is moſt convenient for the Cure of this, as well as all other Diſorders. The Cure alſo ſucceeds more happily in Children and young Perſons than with aged Perſons. When Fractures happen to big bellied Women, they are ſeldom cured till they have got rid of their Burthen.

XV. When the Bone is broken into ſeveral Fragments, the Conſequences are generally Inflammations, Suppurations, or Fiſtulæ, which will not admit of any Remedy till the Splinters are all removed. If the Fracture is occaſioned by an internal Diſorder, ſuch as a Caries of the Bone, you will find it much more difficult to cure, than when it proceeds from any external Violence: Nay, it is frequently an incurable Caſe, unleſs the Occaſion of it, to wit, a ſcorbutic or dropſical Habit of Body, or a venereal Taint, be removed.

XVI. When a large Piece of Bone is driven away by a Piſtol or Muſquet Ball, it is better to cut off the lower Part of the Limb, ſince the two Ends of the Bone are never likely to unite, than to deceive the Patient with the fruitleſs Hopes of a Cure, and weaken him to the laſt Degree, with the Attempt[a]. But when only a ſmall Piece of the Bone is carried off in this Manner, you may ſafely enough attempt the Union of the Parts, but the Limb will be ever ſhorter than the other; and if the Injury is in the Foot, he will be always lame.

XVII. When the Blood inſinuates itſelf through a Fiſſure into the internal Part of the Bone, by corrupting there, it produces a Caries, or Spina Ventoſa, incurable Fiſtula, Tabes, and Sphacelus, which always require Amputation of the Limb, and frequently deſtroy the Patient. The ſame Accidents will happen in Fractures of any Kind, when the extravaſated Blood mixed with the Medulla, and corrupts it.

XVIII. Fractures of the lower Limbs are much more inconvenient than thoſe of the Arm: Though Diſorders of the upper Limbs are eaſier concealed,

[a] HORSTIUS, in *Obſerv. Med. P.* II. *Lib.* IV. *Obſ.* 10. gives us an Account of a Man who ſuffered a Loſs of Subſtance in the Bone of his Foot, of the Size of three Fingers Breadth. But he cured his Patient without leaving any Lameneſs. If the Story is true, it is very extraordinary.

whereas

whereas thoſe of the lower Limbs appear preſently, eſpecially in Men, from the Lameneſs and Deformity which they occaſion, which require great Care in the Treatment of them. On the other hand, the Deformity is more conſpicuous in the Arms of Women: In theſe Fractures, therefore, more Care is required, and a nicer Operation, that the Callus may be formed as ſmooth as poſſible. But where there is a Fracture of the Bones from Gun-ſhot Wounds, eſpecially on the Joints, as the Tarſus, the Knee, Elbow, Shoulder, or Thigh, it is attended with great Danger, and often with Death, if not prevented by immediate Amputation.

Cure of FRACTURES.

XIX. The Surgeon's principal Care in Fractures is to unite the broken Bone, to which three Things are neceſſary. 1. That the Bone be reſtored to its natural Situation, which is to be done by extending it and replacing it. 2. That after the Bone has recovered its natural Situation, it be kept there by giving it Reſt, and applying proper Bandages. Laſtly, 3. You are to uſe proper Means to prevent, or remedy, the Diſorders that uſually attend this Accident. The Knowledge of Anatomy is neceſſary to perform theſe Intentions: For, 1. The Surgeon muſt be acquainted with the Situation and Structure of the Bones, that he may know whether the injured Limb is ſupported by one or more Bones, whether they are large or ſmall, whether they are firm or ſpongy, whether they are even or uneven, whether one or more Bones are broken at the ſame Time. 2. What Muſcles there are in the Neighbourhood of the Bone, their Situation and Office. Laſtly, Whether any conſiderable Nerves or Blood-veſſels are near the fractured Part: All which Things are abſolutely neceſſary to be known by any one, who expects to ſucceed in the Cure of theſe Diſorders. Cure.

XX. When the fractured Bones maintain their natural Situation, you are under no Neceſſity of extending or replacing the Limb, but of applying a proper Bandage. But when the fractured Parts recede from each other, ſome Degree of Extenſion is neceſſary, which muſt be always ſuited to the Diſtortion of the Limb. The greater Diſtance there is between the Extremities of the divided Parts of the Bone, ſo much ſhorter will the Limb be, from the Contraction of the Muſcles; therefore the Extenſion in this Caſe ought to be in Proportion ſo much the greater: But to prevent the Patient from ſuffering any Violence, every Thing ought to be done tenderly, and with great Care. Of Extenſion.

XXI. The Extenſion of fractured Limbs ought to be performed in the following Manner. 1. The Patient is to be kept firm and ſteddy: The Poſture of Body, to be obſerved at this Time, differs according to the Circumſtances of the Caſe: Sometimes the Patient ſhould ſit, either upon a Stool, or upon the Floor; ſometimes it will be better for him to lie upon a Table or a Bed. 2. An Aſſiſtant ſhould ſupport the Limb with his Hands, both above and below the fractured Part. 3. The Aſſiſtant who holds the lower Parts of the Limb ſhould extend it ſtrongly, till you can replace the fractured Part of the Bone: If his Hands alone are not ſufficient to make the required Extenſion, he muſt uſe a Cord, or rather a Napkin: If one Man has not Strength enough for this Office, you muſt employ two, or more. You muſt be very careful not to How the Extenſion is to be made.

uſe too great Roughneſs in this Operation, leſt you ſhould give your Patient unneceſſary Pain.

Means uſed by the Antients for Extenſion.

XXII. The Surgeons amongſt the Antients, when they found that neither Hands nor Napkins were ſufficient to make a proper Extenſion, (which was indeed a very rare Caſe) contrived ſeveral mechanical Inſtruments to anſwer this End. For this Purpoſe you will ſee ſeveral Pullies with Ropes deſcribed; the *Scamnum Hippocratis*, and ſeveral Machines of this Kind, which you will find in the Works of the principal Surgeons, ſuch as ORIBASIUS, PARÆUS, ANDREAS A CRUCE, SCULTETUS, and others. But if we attend to the Obſervations of ſeveral modern Surgeons, which are made with great Accuracy, we ſhall find that Machines of this Kind do not act ſufficiently equal in all Parts at the ſame Time, and that you will find great Difficulty in applying them: Beſides, they are not always at hand in Times of War, and upon many other Occaſions. Therefore it is no Wonder that you ſcarce ever ſee or hear of theſe Inſtruments amongſt the Surgeons of the preſent Times; eſpecially ſince you will always find your Hands or the Napkin ſufficient for any Extenſion that can be required.

What is to be done where you have Tumor and Inflammation.

XXIII. There remains one Obſervation to be made with relation to the Extenſion of the Limb. When the Surgeon is called at ſome Diſtance of Time from the Accident, when a Tumor and Inflammation are come on, it is beſt to defer the Extenſion of the Parts till theſe Symptoms are removed. For it is impoſſible to make a proper Extenſion whilſt the Parts are affected in this Manner, without bringing on the moſt acute Pains, Convulſions, and Danger of Sphacelus. But if the Symptoms of this Kind appear but in a ſmall Degree, it is better to attempt the Extenſion of the Parts inſtantly, before the Inflammation encreaſes.

How the Inflammation is to be treated.

XXIV. Where the Inflammation is already arrived at ſo great a Height as to forbid the Extenſion of the Parts, the Surgeon's principal Care ſhould be directed to aſſuage this Symptom. The ſame Methods which we propoſed for diſperſing Contuſions, (*Chap.* XV, *B.* I, *N.* X, *&c.*) Blood-letting, looſening the Bowels, adviſing the Patient to drink large Quantities of aqueous Fluids, preſcribing ſuch internal Medicines as are known to abate Inflammations, and fomenting the Parts with warm diſperſing Fomentations, will anſwer this Intention. Theſe Applications will uſually remove the Inflammation in four and twenty Hours, in ſuch a Manner that you may ſafely undertake the Extenſion of the Limb. Inſtead of the foregoing Fomentations you may uſe the following, which very powerfully anſwers the Intention it is preſcribed for. ℞. *Herb. Scordii M*ij, *vel* iij. *Aq. ſimplicis* ℔ j. *Spiritus Vini* ℥ vij. *quæ ſimul per Horæ quadrantem probè decoct. admixtiſque Salis Culinaris* ℥ j. *it. Nitri* ℥ ß *identidem cum Linimentis calidè ſupra fractum membrum deligentur.* Where the Inflammation is ſo violent, that it will not yield ſufficiently in the Time abovementioned, to admit of the Extenſion of the Limb, and the Patient is plethoric, you muſt open a Vein, and repeat theſe Applications till they take Place, and the Symptoms diſappear.

Of Splinters.

XXV. Sometimes you will be troubled with Splinters of the Bone in your Way, which vellicate and prick the neighbouring Part, and will render the Reduction of the Bone very difficult. If the Splinters are free, and have no Connection to the Bone, you muſt remove them carefully: If they hang by a Portion

tion of the Periosteum, divide them with your Scissors, for you will never find that they will easily unite again with the rest of the Bone, but will always give you great Uneasiness and Trouble in your Cure. If the Splinters adhere to the neighbouring Parts, and do not much impede the Reduction of the Bone, it will be best to replace the Bone, and to leave the Splinters either to loosen and come away by the Suppuration of the Parts, when they may be taken out without giving the Patient great Pain; or sometimes they will grow again to the rest of the Bone. When they adhere very firmly to the principal Parts of the Bone, we should be so far from attempting to extract them by Force, that we should endeavour to replace them with the greatest Exactness. When this is performed with Accuracy, they will frequently unite to the rest of the Bones. But where that is not to be expected, we must get them out by Degrees in the best Manner we can.

Of Splinters sticking through the Flesh.

XXVI. Where Points of the broken Bones or Splinters stick so far out, that they are an Hindrance to the Reduction of the Bone, you should diligently consider whether you can by any Means contrive their Reunion to the Bone; which you may judge of, by observing at what Distance they are removed from some large Bone, and whether there is a large Quantity of Flesh intervening. Where they cannot be reduced or reunited to the Bone, they may be removed by a pair of strong pointed Forceps, *See Plate* VIII, *Fig.* 1. or if they stick very firm you may use a fine Saw, *Plate* VII, *Fig.* 9. When you have removed the Splinters, you are in the next Place to make your Extension, and reduce the Bone; till they are removed, the Reduction and Reunion of the Bone are generally impracticable.

Of Splinters that are concealed under the Skin.

XXVII. If the Splinters are concealed under the Skin, and you cannot lay hold on them with your Hands, you must first try if you can reduce them to their natural Situation. If this cannot be done, make an Incision through the Skin, and take them out.

Of Extension.

XXVIII. To make a proper Extension of the Limb, two Assistants should be employed, in the Manner we described above at *N.* XXI. and the Surgeon should take hold of the extended Part, and direct it with his Hands, sometimes a little outwards, sometimes a little inwards; now upwards, then downwards; putting it into different Positions, as the Circumstances of the Case shall require, till the Parts have recovered their natural Situation.

How to discover when the broken Bones are replaced.

XXIX. You may know that the Bones have regained their natural Situation, by the Remission or Absence of Pain, and by observing that the fractured Limb is of the same Figure and Length with the sound Limb. If these Signs of Recovery are wanting, you have good Reason to suppose that the Operation is as yet ineffectual, and the Extension is to be repeated or continued in the Manner we have described, till the Bone is replaced.

They are to be kept in that Situation.

XXX. The Bones being properly replaced, the next Thing to be done is to secure them in their Situation, that they may unite to the best Advantage.

How Fractures are to be bound up.

XXXI. Two Things are chiefly required to answer this End. 1. To bind it up properly: And, 2. To lay the Limb in a convenient Posture. The Apparatus for securing the Situation of the Limb is composed of *Bandages*, *Bolsters*, and *Splints* [a], which

[a] The famous PETIT of *Paris* forbids the Use of *Splints*, and supplies their Place with *Bolsters*, which I think will by no Means answer.

which are to be made of thick Paper, of Wood, or, if the Surgeon ſhall think proper, of thin Plates of Copper, Braſs, Steel, Tin, or Lead. *See Plate* VIII, *Fig.* 7. But I think the beſt are thoſe made of Wood or Paper. The Manner of Dreſſing the Limb is as follows: In the firſt Place a Roller is to be paſſed round the fractured Limb; upon this are to be placed Bolſters, and over them Splints, which are to be ſecured by a tight Bandage over all. In ſome Caſes other Inſtruments are neceſſary, ſuch as Boxes made of Paſte-board, Wood, or Metal, to fix the fractured Limb in. *See Plate* IX, *Fig.* 9. Other Inſtruments are alſo neceſſary in this Caſe: The particular Manner of applying which, to the Arms, Legs, and other Parts, we ſhall deſcribe below, when we treat particularly of Fractures; and there you will find that ſimple and compound Fractures require different Bandages. This Apparatus of Inſtruments is required only to ſecure the Bones in their Situation, and to forward their Union. It is no Wonder therefore that Fractures are ill cured, where the Surgeon is ignorant of the proper Methods of applying the Bandage, or the Patient is unruly, and will not give the Limb proper Reſt.

The Uſe of Plaſters in this Caſe.

XXXII. Although great Numbers of Surgeons at this Time make it their conſtant Practice to apply a Plaſter to the fractured Part of the Limb before they make the Bandage, yet the moſt prudent and ſkilful Surgeons amongſt the Moderns entirely reject Applications of this kind, as not only uſeleſs, but injurious to the Patient. For theſe Plaſters can do no Service without the Bandage; but the Bandage alone, if it is dextrouſly made, is ſufficient to keep the Limb firm: And the Plaſter carries this Inconvenience with it, that it ſtops up the Pores of the Skin, and produces Tumors, and moſt violent Itchings. For my own Part, I am entirely of Opinion, that all Kinds of Fractures may be very happily cured without the Uſe of Plaſters, and I am confirmed in this Opinion by long Experience. But if, notwithſtanding this, any one ſhould be bigoted to the Uſe of Plaſters, I would adviſe him to be cautious not to make them of too great Length: They ſhould not entirely ſurround the Limb; but a Thumb's Breadth of it at leaſt ſhould be left bare, leſt the Blood ſhould be obſtructed in its Courſe, which would bring on Tumors, Gangrene, and Spachelus.

Of the Dreſſings.

XXXIII. Before we treat more particularly of Fractures, it will be proper to ſay ſomething briefly of the Apparatus of Dreſſings required in Caſes of this Kind: And ſince the chief Help ſeems to be expected from *Bandages*, we ſhould principally contrive that beſides having the general Properties of a due Length and Breadth, they ſhould alſo be accurately adapted to the Shape of the broken Limb. In Fractures that are not attended with a Wound, you ſhould apply two ſingle-headed Bandages, each of which ſhould take its Beginning upon the injured Part; one aſcending, when it has gone thrice round the Limb, and the other deſcending in a contrary Direction, and then aſcending again. The ſame Windings and Circumvolutions may be made with a ſingle Bandage, if it be long enough; as will appear from our Treatiſe of Bandages.

The Bandage ſhould be neither too tight nor too looſe.

XXXIV. In order to keep the Parts in their natural Situation, the Bandage ſhould be made pretty firm: But if you tighten it too much, you will interrupt the Circulation of the Blood, and excite Tumors, Inflammation, and Gangrene. On the other hand, if the Bandage is made too looſe, it will eaſily come off, and ſet the diſunited Parts at Liberty: The middle Way therefore is moſt eligible. You will diſcover the Mean between theſe two Extremities by obſerving

a ſlight Degree of Tumor below the Bandage, after it has been applied for ſome Time. If the Tumor encreaſes to a violent Degree, you muſt looſen the Bandage: If the Parts do not enlarge at all, you muſt bind it ſtill tighter.

Of Bolſters and Splints.

XXXV. *Bolſters* and *Splints* are to be prepared in proportion to the Size of the fractured Limb: Where the Limb is of an unequal Size in different Parts of it, you muſt fold up the Bolſters in the Manner we have deſcribed at *Plate* IX. *Fig.* 13. You will by this Means be able to apply the Splints to greater Advantage. The Splints ſhould be tied on with three Tapes, the Middle of which is to be faſtened firſt, and then the others.

How the fractured Limb is to be placed.

XXXVI. In Fractures of the lower Arm, after you have applied your Dreſſings and Bandage, you may ſuſpend it in a *Scarf* or *Sling* (by the *French* called *Eſcarpe*) which is to hang from the Neck. *See Plate* XXXVIII, *Fig.* 17. In Fractures of the Leg you may reſt the Limb upon Pillows, *Plate* IX, *Fig.* 5. or in Boxes, *Plate* IX, *Fig.* 9. placing Cuſhions or Pillows under it. Theſe Machines alſo are to be faſtened to the Limb with Tapes, that it may remain fixed and immoveable. Some Surgeons faſten a Pillow under the Limb, after the Application of the Bandage, in Imitation of SOLINGIUS. *See the* Amſterdam *Edition, printed in* 1698, *Plate* XV, *Fig.* 9. Others uſe wooden Boxes, ſuch as you will find deſcribed by SOLINGIUS and SCULTETUS. But the moſt prudent Surgeons prefer Cuſhions or Pillows: For this is not only more uſeful than any other Method, but it is alſo very handy and eaſy to come at. We uſe in this Place a ſort of a *Sole*, *Fig.* 6. made of thick Paper or Wood, which keeps the Foot ſteddy. This ſhould be lined with a ſoft Bolſter, to keep it from galling or fretting the Foot. *See Fig.* 7. It is to be faſtened to the Pillows by the Tapes *a a a*, *Fig.* 6. A Piece of Linen, in the Shape of a Ring, is to be ſewed to the lower Part of this Bolſter, and faſtened on with the Strings, *b b*, *Fig.* 8. This is a Contrivance to ſuſpend the Heel, to prevent Inflammation, Pain, and other Miſchiefs that are frequently brought on by lying upon it too long. The two-headed Bandage has its Uſe in this Caſe; for the Heel may be put into this, and the two Heads of it being ſewed to it, will be kept faſt on. The two Heads of the Bandage are to be placed one under the internal, and the other under the external *Malleolus*, to prevent too great Stricture upon the *Tendo Achillis*, which would bring on acute Pains and Inflammations. You may make an Arch over the Foot with a Piece of Hoop, which will keep the Bed-cloaths from being troubleſome, and at the ſame Time not prevent the Application of warm Napkins, or Fomentations to the Part. *See Plate* IX, *Fig.* 10.

How the Patient is to be treated.

XXXVII. The Patient ſhould lie upon his Back, with his Head and the fractured Limb ſomewhat higher than the reſt of his Body: He ſhould have a Rope with a Handle at the End of it hung from his Bed's Teſter, that he may be able to take hold of it, and raiſe himſelf up when there is Occaſion. If he is of a plethoric Habit of Body, you will do well to bleed him in the Arm, to prevent Inflammation. The Surgeon ſhould be very frequent in his Viſits at the Beginning of this Diſorder, and very diligent in examining whether the Bandage, and other Applications, remain ſufficiently firm or not. If any thing is out of Order, he is to correct it, the Regimen with regard to Diet ſhould be the ſame which we adviſed above, when we treated of Wounds. *See Chap.* I. § XLIII. *and the following.* He muſt not attempt to riſe on any Account, but be ſupplied with Bed-pans, *&c.*

XXXVIII. The

When the Dreſſings are to be opened.

XXXVIII. The firſt Dreſſings ſhould be opened and renewed ſooner or later, in proportion to the Nature and Number of the Symptoms that accompany the Fracture. When the Bandage remains ſufficiently tight, and no bad Symptom appears, you ſhould not looſen it, till the fifth or eighth Day. But where you have Inflammations, Tumors, Pains, and violent Itchings; or where the Bandage is too looſe or too tight, which is frequently the Caſe, you muſt inſtantly take off the Dreſſings, and change them. The ſecond and third Dreſſings muſt be performed in the ſame Manner with the firſt; with this only Difference, That at the third Dreſſing, if you perceive no Tumor, you may make the Bandage tighter than before, and by this Means prevent the luxurious Growth of the Callus, which would occaſion Deformity.

Cure of Fiſſures.

XXXIX. When you have Reaſon to judge, by the Symptoms related above at *N.* III, *and* V, that your Caſe is a *Fiſſure*, you may follow FELIX WURTZIUS's Inſtructions upon the Head. He always laid his [a] Plaſter, which he made uſe of in Fractures, upon the diſordered Part, and upon that he placed Splints, and adviſed the Patient to reſt for ſome Days, and the Tumor will quickly diſappear. When you find the Tumor advanced in Size, and ſoft, it is a plain Indication that it contains a Fluid, which is to be let out by Inciſion. When you have evacuated the corrupted Fluids, you ſhould put a Tent into the Wound, dipt in the *Ungentum Fuſcum Wurtzii*, uſing afterwards the Bandage which is applied to Fractures accompanied with a Wound. If we liſten to WURTZIUS, Ointments, Cataplaſms, Fomentations, and Baths, are of no Service in this Caſe, but are prejudical. For collected Fluids putrifying, corrupt the neighbouring Parts, and the Bones, and bring on Caries, and other grievous Diſorders. The Symptoms that ariſe from Fiſſures are frequently attributed to Defluxions, or to the Gout. Whoever deſires to be more fully informed of the Nature of this Caſe, I would adviſe him to conſult WURTZIUS, *Part* II. *Cap.* xxviii. *pag.* 381. *edit. Baſil. ann.* 1687. GOUEIUS aſſerts, that Fiſſures, when they are juſt made, may be cured by the Application of Bandages without the Aſſiſtance of other Remedies. *See Veritable Chirurgie, pag.* 86.

CHAP. II.

Of DISORDERS *accompanying* FRACTURES.

Of a Fracture accompanied with a Wound.

I. IF a Fracture is accompanied with a Wound, after you have reduced the fractured Bones, you muſt treat the Wound in the ſame Manner with other lacerated Wounds. Firſt, the Wound is to be well cleanſed with warm Wine, Spirits of Wine, or ſalt Water; in the next Place, it is to be filled with dry Lint, to ſtop the Hæmorrhage; then to be dreſſed with digeſtive Ointment [b]; laſtly,

[a] The Plaſter is made in the following Manner: ℞. *Reſinæ pur. & candidæ* ℔ii. *Terebinthin. Vulg.* ℔ſs. *leni igne liquefiant, injecto que demum Radic. Ulmariæ Pulv.* ℥iv. *tantiſper bene ſubigantur, donec modicè frigeant.* When you have a mind to ſpread it upon Linen or Leather, throw it into hot Water. The Author is very high in his Commendation of this Plaſter at *pag.* 320. of his Surgery.

[b] If any Hæmorrhage ſhould happen, you muſt obſerve the Methods we deſcribed when we were treating of Wounds.

it

it is to be anointed with ſome vulnerary Balſam till it is thoroughly healed. Since it is neceſſary to open the Dreſſings every Day, in order to cleanſe the Wound, but at the ſame Time it would be of very bad Conſequence to move the Limb, therefore a great Length of Bandage in this Caſe would be very wrong, eſpecially in the *Femur* or *Tibia:* For it would be troubleſome to lift the Foot up to roll on a long Bandage, which would diſturb the fractured Bones, and throw them out of their natural Situation. For this Reaſon the beſt Surgeons neglect the Uſe of long Bandages in this Caſe, and apply the Bandage of eighteen Heads, *Plate* IX, *Fig.* 4. which may be looſened at Pleaſure. When the Wound is healed, which happens frequently before the Bones are united, you ſhould lay aſide the Bandage of eighteen Heads, and bind up the Limb with long narrow Rollers till the Cure is thoroughly perfected. But we ſhall explain this more largely below, when we come to treat profeſſedly of Bandages.

A Fracture attended with an Ulcer;

II. When a Fracture is attended with an Ulcer without a Caries, which frequently happens in the Leg or Thigh; it is to be dreſſed every Day, after the ſame Manner as we directed for a Wound in the ſame Circumſtances: Having firſt replaced the Bone, the Limb is to be bound up with the Bandage of eighteen Heads, till the Ulcer is healed. But when the Ulcer is healed, and the fractured Parts of the Bone not ſufficiently united, you muſt lay aſide the Uſe of the eighteen-headed Bandage, and apply long narrow Rollers, as we adviſed above for a Fracture attended with a Wound.

with a Caries.

III. Sometimes the Fracture happens upon a Part that has been long troubled with an Ulcer and Caries; this Caſe is very difficult of Cure, nay frequently it admits of no Cure at all. Very few Writers in Surgery have laid down any Directions, by which we may be guided in this Caſe. PETIT indeed deſcribes the Caſe of a *fractured Tibia attended with a Caries:* But as he has related the Caſe of the Tibia alone, neglecting to deſcribe it as happening to other Parts, he has in my Opinion, by no means ſatisfied the Subject. However, this may ſerve as an Example to be imitated in ſimilar Caſes, till we ſhall be furniſhed with more perfect ones. A young Man, who had been for ſome time troubled with an Ulcer and Caries, about the Middle of the Tibia, had the Misfortune to break the Bone in the very Part, the Fibula remaining at the ſame time whole; therefore no Extenſion was required in the Cure of this Fracture. PETIT, in the firſt place, took off all the vitiated Fleſh that was ſituated near the fractured Part, with his Knife, and reduced the Ends of the Bone into their proper Situation with his Fingers, and then filled up the Ulcer with dry Lint, and covered all with the eighteen-headed Bandage, as above. After ſome Days, when the Fever was quieted, he cauteriſed the Extremities of the fractured Bone that were affected with Caries, and afterwards took off the carious Parts with the Trepan, which the *French* call *Trepan exfoliatif:* Having done this, he applied Lint to the naked Bone, well ſaturated *cum Tinctura Aloës.* But he dreſſed the fleſhy Parts firſt *cum Unguento digeſtivo*, and afterwards *cum Unguento fuſco*, to keep down the Luxuriancy of the hard Fleſh, which is very prejudicial in this Caſe: And this Method of dreſſing he continued for fifty Days, till the diſorded Parts of the Bone ſeparated from the ſound. He then began to encourage the Groath of new Fleſh, by applying vulnerary Balſams, and healed both the Bone and Ulcer after the uſual Method.

IV. But

A fractured Thigh with a Caries.

IV. But the Caſe is attended with far greater Difficulties when the Fracture happens upon an ulcerated Part, attended with [a] Caries in the Thigh; which Caſe I find entirely neglected in PETIT's Book of Fractures. I knew a Student of about twenty Years of Age, who had been troubled for many Years with an Ulcer and Caries, in the Middle and internal Part of his Thigh, near the Situation of the crural Artery. The Fleſh in this Part was ſo thick, that the Caries did not appear, and the Vicinity of the great Artery prevented us from enlarging the Ulcer with the Knife, or from cauteriſing the Bone, ſo that all the Medicines which were applied had no Effect: At length, as he was walking about, the Thigh broke in this diſordered Part, without the Aſſiſtance of any external Force. What ſhould we do now? we were prevented from enlarging the Wound, or cauteriſing the Bone, by the Reaſons I juſt mentioned: And though we replaced the Bone, and applied a proper Bandage, yet it would never unite, but the Patient dragged on a miſerable Life. Therefore it is worth our ſerious Conſideration, what is the beſt Method of Cure for Fractures of this Kind when they happen in the Thigh, Arm, or other Parts where the Bones lie concealed and cannot be laid bare with Safety. But this is rather to be wiſhed for than expected.

Of the Callus.

V. The Surgeon has done his Duty in the Treatment of a Fracture, when he has diligently replaced the Bones, and taken Care to preſerve them in that Situation. For Nature has provided for the reſt, by ſupplying the divided Parts with a Callus; a Sort of Gelly or liquid viſcous Matter, that ſweats out from the ſmall Arteries and bony Fibres of the divided Parts, and fills up the Chinks or Cavities between them: This firſt appears glewy, then of a cartilaginous Subſtance, but at length becomes quite bony, and joins the fractured Parts ſo firmly together, that the Limb will often make greater Reſiſtance to any external Violence with this Part, than with thoſe which were never broken, in the ſame Manner as we frequently ſee it happens to Pieces of Wood well glewed.

Its Growth.

VI. But as the new Fleſh in Wounds will frequently ſprout up too faſt, ſo will the Callus in Fractures, and by this Means render the Limb uneven and deformed, eſpecially in Fractures attended with a Wound. Where this is the Caſe, and you ſee plainly that you cannot prevent it, you had beſt inform your Patient of it in Time, leſt he ſhould blame his Surgeon as the Author of his Deformity. For it cannot always be prevented or remedied; nor can you take off the Luxuriancy of a Callus as you can of the Fleſh, for ſeveral Reaſons of Conſequence: Therefore when once it is formed it remains without Cure.

How to prevent the Luxuriancy of the Callus.

VII. But ſome Meaſures may be taken to prevent the Callus from exceeding its due Bounds, by making the Bandage ſomewhat tighter than ordinary, and wetting it firſt with the beſt rectified Spirits of Wine. This will not only keep the viſcous Matter within its Bounds, but will alſo forward its Induration. Which may be obſerved in the Tibiæ of Men and the Arms of Women, as thoſe Parts are more frequently expoſed to View. But in Fractures attended with a Wound, as they will not admit of too tight a Stricture; eſpecially if you uſe the eighteen-headed Bandage, it is extreme difficult to prevent a Luxuriancy of Callus. When once the Callus is indurated, we have no Medicine that will take it down or deſtroy it. Nevertheleſs, there are ſome who pretend that it is

[a] *Lib. De Morb. Oſſ.* Tom. II. p. 270, &c.

to

to be disperſed by the *Emplaſtrum de ranis Vigon. cum Mercurio*, tying a Plate of Lead over it. The Callus grows ſometimes faſter, ſometimes ſlower, according to the Size of the fractured Bone, the Habit of the Patient's Body, the Temperament of the Air; and laſtly, in Proportion to the Patient's Age. When it comes on but ſlowly, ſome Surgeons place great Confidence in the Patient's taking *Oſteocolla*, half a Drachm at a Doſe.

To prevent violent Itching.

VIII. Violent Itching is beſt prevented by removing oily fat Remedies, and therefore the Plaſters themſelves, from the Limb: For they are compoſed of ſuch Particles that they ſtop up the inſenſible Pores of the Skin. If the Itching remains after the Removal of theſe Applications, you may waſh the Part with warm Wine, Oxycrate, or Spirit of Wine, covering it up with ſoft, fine Linen. If Bliſters riſe upon the Part, they ſhould be ſnipt with the Sciſſors.

Of Inflammation, Pain, and Convulſion.

IX. Inflammations are to be treated in the Manner we adviſed above in *Book* I. *Chap.* XV. But to remove Pains and Convulſions, you ſhould diligently attend to what we laid down in deſcribing the Cure of Wounds: But above all, you ſhould be very accurate in replacing the fractured Bones, and in obſerving whether they maintain the Situation which you reſtored them to; and if you obſerve any Splinters quite free from the neighbouring Parts, you ſhould inſtantly remove them, and endeavour to lay the Limb in an eaſy Poſture. In theſe Circumſtances you ſhould not neglect to open a Vein, and to apply emollient and diſperſing Cataplaſms and Fomentations, preſcribing at the ſame time Medicines to be given internally with this Intention, and adviſing the Patient to obſerve a proper Regimen with regard to his Diet. Without obſerving theſe Rules, violent Inflammations, Sphacelus, and Death itſelf will frequently enſue.

How a Gangrene is to be treated.

X. If the Inflammation is ſo violent as to threaten a *Gangrene* of the Part, you muſt bleed inſtantly, lay aſide the long narrow Bandages, and apply the Bandage of eighteen Heads, uſe Fomentations prepared *ex Aquâ Calcis & Spiritu Vini Camphorato cum Eſſentiâ Aloes & Myrrhæ*; *vel ex Spiritu Vini Camphorato & Sale Ammoniaco*, or the Remedies we recommended above, treating of Fractures, *C.* I. *N.* XXIV. and in the Chapter on *Contuſions*. But if the Part is already affected with *Gangrene*, you muſt make frequent and deep Scarifications, to ſet the ſtagnating Fluids at Liberty, not neglecting at the ſame time to apply externally the Fomentations we recommended above, and to give the Bark inwardly. When the *Gangrene* has penetrated ſo deep into the Parts, that it is beyond the Reach of Fomentations, and begins to be ſphacelated, you muſt take off the Limb, to ſave the Life of the Patient.

Of Hæmorrhage.

XI. If the Fracture is attended with a conſiderable Diſcharge of Blood, you ſhould diligently examine whether the Hæmorrhage proceeds from a Vein or an Artery. Whether the Flux of Blood is to be ſtopped by Preſſure, by the Help of dry Lint, Bolſters, and Bandages; or by ſtyptic Medicines, or by making a Ligature upon the injured Veſſels; or laſtly, by the actual Cautery, as we have taught above *Chap.* II. on *the Cure of Wounds*. After the Blood is ſtopped, the Bones are to be replaced, extraneous Bodies are to be removed, and the Limb bound up.

Of Palſy and Waſting of the Limb.

XII. If a Relaxation of the Nerves, or Waſting of the Limb, ſucceed a Fracture, there are very little Hopes of help. However it will be adviſeable, (1) To rub the Limb well with hot Cloths; (2) With ſpirituous Medicines, ſuch as

Spirit. Formicar. Lubricor. Matricalis, C. C. Sal Ammoniac, Essentia Euphorbii, Castor, and others. (3) To foment the Limb with warm Fomentations and Baths made *ex Vino Herbisque corroborantibus, Aromaticis ac Nervinis, vel Thermis naturalibus.* (4) Lastly, the best Remedy, in my Opinion, is, to wrap the tabid Limb up in the Skin of an Animal that is just killed, and remains in its natural Heat: For by this Means the Flux of the Blood and nervous Juices to the Part, is very much excited: And more particularly so when you prescribe at the same time nervous and strengthening Medicines to be given internally.

Stiffness of the Joint.

XIII. When the Joint is become rigid and inflexible, which Disorder the *Greeks* call an *Anchylosis*, if it is occasioned by a Discharge of the Juices of the broken Bone into the Joint, which concretes there instead of forming a Callus in the fractured Part, this Case will turn out very difficult to cure. But if this Disorder is occasioned by having kept the Joint for a long Time without Action, or from a Concretion of the Juices that are secreted in these Parts to make them slippery and easy to move; it will be very proper to foment the rigid Part with emollient Fomentations and Baths; to rub it frequently with Oils and Fat of Animals, or with emollient Ointments; and to move it backwards and forwards frequently with your Hands, till it shall recover its natural Faculty of moving [a].

Fracture with Dislocation.

XIV. You have frequently a Dislocation as well as Fracture of the Bone, in one and the same Limb. When this is the Case, the Luxation must be remedied in the first Place; and then the fractured Parts may be restored to their natural Situation: Each of them must be dressed with a proper Bandage. Sometimes the Fracture happens so near the Head or Articulation of the Bone, that it is impossible to fix your Hands or Instruments to make a proper Extension. In this Case, the Fracture is first to be attended to; which must be cured, before you can attempt to remedy the Luxation: Though you should be very careful, during the Cure of the Fracture, to foment the luxated Limb *cum Spiritu Vini, vel solo, vel camphorato, vel & aceto calefacto.* This Method may keep the Part free from Inflammation and Tumor. I will not pretend to affirm, that this Method of Cure is always to be depended upon: For it frequently happens that the luxated Parts are to be reduced by no Art. But as this is the only probable Method of relieving the Patient, and as there are frequent Instances of its being attended with Success, even where the Luxation has been of some Months, or even a Year's standing, I think it ought by no Means to be rejected [b].

In what Manner Limbs are to be broken again, when they have been ill set.

XV. If a fractured Limb appears crooked and deformed after the Cure has been performed, which Accident happens either from the Negligence of the Surgeon, or from the imprudent and restless Behaviour of the Patient; I know of no other probable Method of restoring the Limb to its former Shape and Beauty, than by making a strong Extension of it, and breaking it in the Part where it is just united: By this Means the Parts may be replaced in a more proper Manner. Great Care and Circumspection is required in the Treatment of the second Fracture. When the Deformity complained of is but small, and the Callus intirely indurated, or where the Patient is in Years and infirm, I should not advise this Method of Cure to be attempted; since it is not only attended with great Pain, but with great Danger also. On the other hand, when the Callus is tender, and the Patient young and vigorous, I think this Operation

[a] For the Cure of an *Anchylosis* see LE DRAN, *Obs.* 93, 94. and BOERHAAVE's *Aph. Pract. N.* 556.

[b] See PETIT, on *Diseases of the Bones.*

may

may be fairly attempted. In the mean Time, it is neceſſary to obſerve here, that before you undertake this Cure, you muſt endeavour to ſoften the Callus, by uſing emollient Baths, Fomentations, and Ointments, for ſeveral Days.

CHAP. III.

Of FRACTURES *in particular.*

The Connection and Argument of this Chapter.

I. SINCE we have already treated of Fractures of the Bones in general, it remains now that we ſpeak to particular Fractures. And firſt, in this Chapter, we ſhall treat of thoſe that happen in the Head. We ſpoke largely enough above in *Chap.* XIV. of Fractures of the Cranium: Therefore we ſhall now proceed to deſcribe other Kinds of Fractures.

FRACTURE *of the* NOSE.

Fracture of the Noſe.

II. In the Noſe, both Bone and Cartilage are the Subjects of Fracture, which happen ſometimes on either Side; ſometimes in the Middle, chiefly by a Blow or Fall: This is eaſily to be diſtinguiſhed by the Sight or Touch. If either of the Bones in the Front of the Noſe are fractured, it produces a Flatneſs in the Noſe, and the Air meets with Obſtructions in its Paſſages through the Noſtrils. If the Bone on either Side is fractured, the Part becomes hollow: When the Cartilage is diſturbed, the Noſe inclines too much to one Side. *See* CELSUS *upon this Head, Lib.* VIII, *Cap.* 5. Sometimes the Fracture happens without a Wound, but is much oftner attended with a Wound of the common Integument. *See* SAVIARD, *Obſ.* 107. If the Injury of the Noſe is very violent, the Fracture cannot be ſo perfectly cured, but ſome Deformity will ſtill remain. The Vicinity of this Part to the Brain, which is frequently injured at the ſame Time, renders Caſes of this Kind frequently very dangerous. A *Caries* alſo, *Ozæna*, and *Polypus*, are no uncommon Attendants upon this Diſorder: By which Means the Senſe of Smelling, the Faculty of Speech, and the Actions of Inſpiration and Exſpiration, are very much diſturbed.

After what Manner Bones of the Noſe are to be replaced.

III. In order to reſtore the fractured Bones of the Noſe to their natural Situation, the Patient is to be placed in a Seat oppoſite to the Light, and his Head held back by an Aſſiſtant. The Surgeon is to raiſe the depreſſed Parts with a Spatula, Probe, or a Quill, applying externally the Thumb of one Hand, and the Fore-Finger of the other. If the Bones of the Noſe are fractured on both Sides, they are to be raiſed on each Side after this Manner, and the Cavity of the Noſtrils is to be filled up with long Doſſils to prevent the Bones from collapſing; covering the Part alſo, for this End, with ſome Plaſter, having firſt applied ſuch Dreſſings as are ordinarily uſed to recent Wounds. If the Bone is fractured into ſeveral Splinters, they are to be forced into their proper Places by the Fingers; but if a Splinter is ſo entirely ſeparated from the Bone, that it will not eaſily unite with it again, you muſt remove it with your Forceps.

How a Fracture with a Wound ſhould be treated, and Bandage be performed.

IV. When the Fracture of this Part is accompanied with an external Wound, after you have replaced the Bones, you ſhould dreſs the Wound (at firſt) with dry Lint, covering it with a vulnerary Plaſter: Afterwards you muſt uſe balſamic Medicines; ſuch as *Ung. Digeſtiv. Eſſent. Aloes, Myrrhæ, Succin. Maſtich.* All greaſy and oily Medicines are to be diligently avoided here, and in all

other Caſes where the Bone is injured; becauſe they are very hurtful in theſe Caſes. But where you have no external Wound, it will be ſufficient to apply a ſticking Plaſter to the Part, to ſecure the Bones in their Situation: And by this Means you will find they will unite in about fourteen Days; if no Abſceſs or Caries ſupervene. If the Bone ſhould require a ſtronger Support than what we have hitherto mentioned, you may make one of ſingle or double Cap-Paper, which may be adapted to each Side of the Noſe, and ſupported with Bolſters. *See Plate* VIII, *Fig.* 8. The whole muſt be ſupported with a Bandage of four Heads, which muſt not be bound on too tight; which will appear to you more clearly, when you conſult what we ſhall ſay below, where we are to treat profeſſedly of Bandages. Before the Plaſters and Bandages are applied, ſome introduce a Silver or Leaden Pipe, or Quill, into each Noſtril, to render the Faculty of Breathing eaſier. *See Plate* II, *Lett.* P *and* Q. In order to ſecure theſe Pipes and the Bones of the Noſe in their proper Situation, they uſe the four-headed Bandage. Some amongſt the modern Surgeons intirely reject the Uſe of all this Apparatus, except the Bolſters, Bandage, and Plaſter; for they are of Opinion that it does more Harm than Good, and that the Introduction of Pipes, or even Tents, into the Noſtrils, will occaſion ſo great a Degree of Irritation, and ſuch a Difficulty of Breathing, as is not to be borne: Beſides, when once the Bones of the Part are properly replaced, they are not ſo eaſily diſturbed as is commonly imagined. In theſe and all other Caſes, where there is no Neceſſity for a more laborious and complicated Treatment, the ſimpleſt and eaſieſt Method of Cure is always to be preferred.

CHAP. IV.

Of a FRACTURE *of the* JAW.

Of a Fracture of the Jaw.

I. THO' both Jaws are liable to Fractures, the upper is leſs ſo than the lower; and even that, than the reſt of the Bones. When they happen in the upper Jaw, the divided Parts muſt be replaced, as near as poſſible; and then covered with a Plaſter, as in the Noſe. When in the lower Jaw, it is broke either on one Side or on both; and the divided Parts in this Caſe do not recede any conſiderable Diſtance from each other; for the Muſcles of this Part are ſo ſituated, that the Bones are not much ſeparated from each other by their Action. But the Degree of Injury depends upon the Violence of the Blow received.

By what Signs a Fracture of the Jaw is known.

II. That Kind of Fracture in this Part is ſooneſt diſcovered, where the Bones are ſeparated from each other. For not only your Eye, and often your Ear, but eſpecially the Touch, will ſpeedily and evidently demonſtrate what is diſplaced in the Jaw; and whether the natural Poſition of the Teeth be diſturbed. Beſides which, the Patient's ſuffering violent Pains, and ſometimes Convulſions, is uſually a pretty certain Sign that the Jaw is fractured: But if the Pieces of the Bone are not ſeparated, the Fracture is diſcovered with much more Difficulty.

How the Bones of the Jaw are to be ſet or replaced.

III. A Fracture of the Jaw being thus diſcovered, our next Intention is to reſtore the broken Bones to their proper and natural Poſition. The Patient is therefore to be commodiouſly ſeated againſt the Light, and his Head to be held firm

firm by an Aſſiſtant. The Surgeon is then to introduce his Thumb or Fore-Finger of one Hand into his Mouth, applying his other Hand externally: And by this Means he is to preſs the Fragments of the Jaw on each Side, till they have regained their former Situation; which may be known by the regular Diſpoſition of the Teeth. But if any of the Teeth be found looſe or ſlipped out, it may not be improper, if nothing hinders, to reſtore them afterwards to their Places[a], and to faſten them by Gold or Silver Wire, or with Cerate, to ſuch as are next them: For by this Means they have been frequently held firm. If the Jaw ſhould happen to be broke on both Sides, they muſt be reſtored one after the other by the ſame Method as before. But then the Operation is uſually more or leſs ſucceſsful in proportion to the Surgeon's Skill in the Anatomy of this Part. If there ſhould be a Piece not moved out of its Place, there will be no Occaſion to reſtore it.

IV. After the Bones are properly reduced, they muſt be covered with, firſt, a Plaſter, and then a Compreſs, dipped in *Sp. Vini*, and applied internally; and another Compreſs ſewed to a Piece of Paſte-board in the Form of a half Jaw, is to be laid on externally. *See Fig.* 9. *Tab.* VIII. Theſe are to be kept on by the Bandage with four Heads, perforated in the Middle, to let in the Chin; or elſe it muſt be very carefully bound up with the particular Bandage for this Caſe, which we ſhall deſcribe when we come to treat profeſſedly of Bandages. But whenever the Jaw is found to be fractured on both Sides, it is uſual to introduce and apply internally, after the Compreſs dipped in *Sp. Vini*, another made of thin Paſte-board, perforated in its Middle, and accommodated to the Figure of the Chin, as at *Fig.* 10. In this Manner its Middle (*a*) that is perforated, is to be applied to the Chin; and its two Extremities (*bb*) toward the Ears. But Fractures of this Part may be well enough cured without Plaſters and Splints, where we can commodiouſly apply a Bandage: For the Bones are not very eaſily diſplaced, when they are once reduced. In what manner this Part is to be bound up, we ſhall make pretty evident, when we come to treat of Bandages in particular. What is to be done after the Jaw Bone is ſet.

V. To forward the Agglutination of the fractured Jaw, after Phlebotomy, the Patient ſhould be reconciled to reſt as much as poſſible; but above all he ſhould ſtrenuouſly avoid, particularly for the firſt Days, all Talk and Eating. It ſeems therefore to be much the ſafeſt Way to live upon, till the Jaw is grown firm, only fluid Aliments, ſuch as Broths and Soops, poached Eggs, Gellies, and the like, taking Care not to lie on the Back, and ſtrictly to avoid turning on the Face, or either Cheek. By which Means the Fracture will be well in about twenty or thirty Days: Eſpecially if the internal Parts of the Mouth that are injured, be frequently moiſtened with a little *Mel Roſarum*. How the Patient ſhould behave himſelf under the Cure.

VI. If the Fracture be attended with a Wound, it muſt be undone every Day, and treated as we have taught in *Chap.* IV, *N.* VI. till it be healed. An Example of a Fracture in both Jaws may be ſeen in LE DRAN, *Obſ. Chirurg.* 3. *Tom.* I. but of the lower Jaw only, in *Obſ.* 8.

[a] GOUEUS indeed, diſſuades us from this Method, thinking that the Bones will by this Means be again diſplaced; but TURNER, (and ſome others) in his *Surgery*, gives an Inſtance where it ſucceeded; and ſo does LE DRAN, *Obſ.* 3. Tom. I.

CHAP.

CHAP. V.

Of a FRACTURE *of the* CLAVICLES, STERNUM, *and* HUMERUS.

Of a fractured Clavicle.

I. THE Clavicle[a] is extremely subject to be fractured both from its transverse Position, and from its Smallness; which happens either in its Middle, near the *Humerus*, or near the *Sternum*. But in which-ever of these Parts it is broke, that End next the *Humerus* always descends lower than the other, next the *Sternum*; from the Weight of the Arm, which was before sustained by the Clavicle and Head of the *Sternum*. And notwithstanding that Part of it next the *Sternum* remains immoveable, by the Descent of its other End, it can scarce happen but they will, in some Measure, collapse one over the other.

How a Fracture of the Clavicle is to be discovered.

II. It is no great Difficulty to know when this Part is fractured. For (1) it will be hardly possible for the Patient to lift up his Arm: (2) His Arm will hang inclining towards his Breast, whereas before it was straight, or tended rather backward: (3) And lastly, as the Clavicles are covered with scarce any Muscles, the Fracture will be greatly evident both to the Touch, the Eye, and the Ear; especially upon any small Motion of the Part.

The *Prognosis* of a fractured Clavicle.

III. When the neighbouring Parts are not affected, this Fracture is attended with no bad Consequences: But if the adjacent Veins or Arteries, or even Nerves are injured, there is generally great Danger. The Reduction of a broken Clavicle is not very hard to be effected, especially when the Fracture is transverse: Nor is it usual for the *Humerus*, with the Fragment of the Clavicle, to be so far distorted as not to be easily replaced with the Fingers. But the Difficulty is much greater to keep the Bone in its Place, when the Fracture is once reduced, especially if the Bone was broken obliquely. For which there are two Reasons: *viz.* the circular Bandages, with which the Bones of the Arms and other Extremities are usually held very firm, cannot be applied here, by reason of the Form and Situation of the disordered Part: And then the Weight of the depending Arm itself, soon pulls asunder what the Surgeon has been replacing. It is no wonder, therefore, if the Juncture of the Clavicle be often found either uneven or unfirm after its Agglutination. Yet we do not want Examples where fractured Clavicles have been very happily and firmly cured, especially when the Patient keeps himself quite free from Motion.

How the broken Clavicle is to be reduced.

IV. A Fracture of the Clavicle is to be reduced in the following Manner. The Patient must be placed on a low Seat, and an Assistant is to thrust his Knee against the Middle of the Patient's Back, between his two Shoulders; then laying hold of the Patient's Shoulders with each Hand, he must pull them gently and gradually backwards: By which Means the Clavicles will be properly extended. Whilst this is doing, the Surgeon must stand before, and endeavour to replace the Bone with both his Hands, ordering the Assistant to hold the Bone in that Position. He is then (1) to apply the narrow and thick Compress (*Tab.* IX, *Fig.* 13.) folded up at each End, so as fill up the Cavities above and below the Clavicle. Upon these (2) he is to lay two more narrow

[a] A Fracture of the Clavicle is by CELSUS (*Lib.* VIII, *Cap.* 8.) called *Jugulum fractum*: but all the modern Surgeons and Anatomists give the Name of *Clavicle* to this Bone, and attribue a quite different Signification to the Word *Jugulum*.

Compresses,

Compreſſes, made in the Form of the *Letter* X. Over all theſe, he is (3) to apply a Piece of Paſte-board (*Tab.* VIII, *Fig.* 12.) accommodated to the Shoulder and Neck, and firſt ſteeped in *Sp. Vin.* or Oxycrate. Then he muſt (4) place a Ball under the Arm, or bind it ſeveral Times with a thick Roller, to prevent the *Humerus* from ſubſiding. And laſtly (5) the whole is to be diſcreetly bound up, and the Arm ſuſpended in a Saſh or Sling, that is put about the Neck. The Plaſters that were uſed to be frequently applied in this Caſe, have been generally found uſeleſs.

V. As it is ſometimes very difficult to keep the Arms from puſhing inwards, which would diſturb the Agglutination; it will be of Service to uſe a Wooden or Iron Inſtrument (*Tab.* VIII, *Fig.* 13.) in the Form of a T, ſo contrived as to keep back the Shoulders. The Sides of this Inſtrument are about the Breadth of three Fingers, and lined with Cloth or Leather. It is to be applied thus: *viz.* The two Arms AA, are to be placed againſt each Shoulder, and the perpendicular Part B, is to go againſt the Middle of the Back. Through the Aperture C, is paſſed a double Ligature to faſten it to the Body, the two Arms being firſt put through the Rings AA, which may be widened or narrowed at Pleaſure. The tighter the perpendicular Part B is faſtened to the Body, the more the Shoulders are by that Means drawn backward. But if they cannot be this Way drawn tight enough, a Compreſs, folded lengthways, is to be firſt placed between the Back and the Inſtrument: By which Means the Shoulders will be drawn more ſtrongly backwards. The Rings AA, may be made of Iron or Leather, ſo as to be taken in, or let out, as there may be Occaſion.

What is to be done in caſe of looſe Splinters.

VI. Whenever there are any looſe Splinters of the Bone that are intirely ſeparated, which not only wound and hurt the Fleſh, but obſtruct the Meeting of the Clavicle; it ſeems altogether requiſite to open the Skin and remove them, before the Reduction of the Bone, treating the Wound as uſual. But if there ſhould be any Splinters which ſtill adhere to the Bone, and prick the adjacent Parts, or impede the Reduction; they muſt be alſo either taken off with the *Forceps*, (*Plate* VIII, *Fig.* 1.) or elſe forced into their Places, whereby they may be again united to the Bone. But to divide the Parts, and remove the Fragments, requires great Caution; leſt ſome of the large ſubclavian Veins or Arteries be wounded in the Operation, and a fatal Hæmorrhage be thereby produced.

Of a Fracture of the *Scapula*.

VII. The *Scapula* is uſually fractured, either near its *Acromion* or Head, where it joins with the Clavicle, or in ſome other Part; which will be diſtinguiſhed by the Eye, or the Touch. If in its *Proceſſus Acromium*, the Reduction may be eaſily made, by lifting up the Arm to relax the Deltoide Muſcle; or by puſhing the Arm evenly upwards, and drawing the fractured Parts together with the Fingers; but then they eaſily ſlip away again, by any ſlight Cauſe, and ſo are difficultly agglutinated: More eſpecially they are eaſily ſeparated by the Weight and Motion of the Arm, and the Contraction of the Deltoide Muſcle: Inſomuch that there is ſcarce any body that ever cures a fractured *Acromion* ſo as to admit afterwards of a free Motion of the Arm upwards [a]. In the mean Time all Means muſt be uſed to retain the replaced Bones in their right Situation: A Compreſs wet with *Sp. Vin.* is to be applied to the Fracture; a Ball is to be put under the Arm-pit to ſupport it; the whole is to be bound up with

[a] Such is the Opinion of CHESELDEN, treating of this Bone, in his Anatomy.

the

the Bandage commonly called *Spica*, and the Arm is to be ſuſpended in a Saſh or Sling, hung about the Neck; and the Patient muſt reſt himſelf without Intermiſſion. But if the Neck of the *Scapula*, which lies under the *Acromion*, or its *Acetabulum* ſhould be fractured, (which is a Caſe that as ſeldom happens as it is difficult to diſcover, by reaſon of its thick Covering) it is a hundred to one, but from the Vicinity of the Articulation, the Tendons, Muſcles, Ligaments, Nerves, and large Veins and Arteries, there will follow a Stiffneſs and Loſs of Motion in the Joint, a violent Inflammation, Swelling, and Abſceſs, with the worſt of Symptoms, and even Death itſelf: As happened in a Caſe I ſaw, of a certain Profeſſor at *Helmſtadt* [a]. But when the Fracture falls on ſome other Part of the *Scapula*, the Symptoms are generally much milder.

How the fractured *Scapula* is to be reduced.

VIII. That the fractured *Scapula* may be ſet with the greater Readineſs, an Aſſiſtant is to extend the Arm gently forwards: The Surgeon in the mean Time dextrouſly replacing the Fracture with his Hands, ſhould apply afterwards the proper Compreſſes, and Slips of Paſte-board, ſuitable to the *Scapula*, and firſt wet with *Sp. Vin.* or Oxycrate; which are then to be firmly bound on with the *Stellate*, or four-headed Bandage, as we ſhall direct at large in the third and laſt Part of his Treatiſe.

FRACTURE *in the* STERNUM.

Of a fractured *Sternum*.

IX. The *Sternum* is equally ſubject to Depreſſions and Fracture, from Falls or Blows, with the reſt of the Bones. When either of theſe happen, the Part is not only uneven and painful, but the ſubjacent Arteries and Veins are alſo contuſed or ruptured; whence ariſe Pains in the Breaſt, Difficulty of Breathing, violent Coughs, ſpitting of Blood, or elſe Extravaſations of it in the *Præcordia*, or between the Duplicature of the *Mediaſtinum*, with many bad Symptoms of the like Nature.

The Signs of a fractured *Sternum*.

X. The Signs therefore of a fractured *Sternum*, will be, in my Opinion, ſufficiently evident, from what follows. Namely, its Depreſſion or Fracture will appear not only from the Symptoms beforementioned (*N.* IX.) but frequently alſo from the *Sternum's* being unequal or moveable to the Touch; eſpecially when one Part grates againſt the other. The Depreſſion of the *Sternum* will be alſo apparent, not only from the Symptoms of the preceding Section, but alſo from the Cavity or Inequality made in this Part, which is a Sign peculiar to this Diſorder.

How the *Sternum* is to be replaced.

XI. In order to ſet the Fracture, if any Part of the Breaſt-bone be diſplaced, it will be very ſerviceable to lay the Patient on his Back, upon a Bed, or rather a Table, putting a hard Pillow, a large Piece of Cloth rolled up, a Drum, or other Cylinder under his Back, preſſing down his Shoulders, by which Means the *Sternum* will be elevated and extended. And to facilitate the Reduction, the Surgeon muſt preſs the Sides of the Breaſt together, and ſhake them pretty ſtrongly. By this Means you not only puſh the Ribs forwards, but at the ſame Time force what is depreſſed in the *Sternum* into its natural Situation. But when this Method is impracticable, or not proper, the Skin muſt be divided, and the depreſſed Part of the *Sternum* lifted up into its Place, by means of a Lever,

[a] The ſame has been obſerved by CHESELDEN *(loc. citat.)* and by DOUGLASS.

commonly called an Elevator; or else by a Screw, gently wormed into the Part, and pulled upwards. Notwithstanding this Way of Cure is more operose and difficult than the former, it is preferred by GOUEY (in his *Chirurgie veritable*) and PETIT *(de Morb. Oss.)* as the best and readiest Method. As for the fittest Method of retaining the *Sternum* after its Reduction, we shall treat of that more at large, when we come to the Doctrine of Bandages. But if, as it sometimes happens after the Reduction, violent Pains continue under the *Sternum*, and if Blood should gather and suppurate internally between the Duplicature of the *Mediastinum*, it will not be improper to trepan the lower Part of the *Sternum* (as PETIT advises) after the Manner we do the *Cranium:* And when the putrid Matter is discharged, and the Cavity cleansed, it should be carefully treated with some vulnerary Balsam. Lastly, if any Blood should be found extravasated in the Cavities of the *Thorax*, the Cure seems to depend entirely upon discharging this by the *Paracentesis*, in the Manner we have described under Wounds of the *Thorax*. As to the Business of Dressing, after the Application of Compresses dipped in warm Wine, or *Sp. Vin.* we must go on with that Kind of Bandage called the *Napkin-and-Scapulary*.

CHAP. VI.

Of FRACTURES *in the* Ribs, Vetebræ, Os Sacrum *and* Innominatum.

I. SOMETIMES the Ribs are fractured, or only fissured, in such a Manner, that barely some external and internal Part of them are hurt, and not moved out of the natural Places: Which Case is usually attended with no bad Symptoms, and is often scarce discoverable, the Bone growing together again of itself. But if the whole Rib be fractured, and some Part of it moved out of its Place, it is a more dangerous Case: For the costal Muscles, and the *Pleura* that lines the internal Cavity of the *Thorax*, will be very much disturbed, inflamed, or torn by the separated Fragments of the Bone. When a Rib is fractured, it projects either externally or internally, much in the same Manner as if it was a broken Arch: When it projects externally, the Symptoms are usually much the milder[a]; but when it is driven inwards, the Case is much worse, especially if any of the Intercostal Veins or Arteries be divided so as to let Blood run into the *Thorax*. In Consequence of which, we need not wonder if violent Prickings, Inflammation, difficult Respiration, Cough, Fever, Spitting of Blood, Suppuration, Extravasation of Blood in the *Thorax*, or cellular Interstice of the *Mediastinum*, and other bad Symptoms should follow in Course; especially if the neighbouring *Viscera*[b] be wounded, or more Ribs be broken at the same Time. If these be not timely remedied, they produce violent Fevers, Inflammation, and Ulceration of the Breast and Lungs, *Empyemas*, incurable *Fistula*, and *Caries* of the Bones; and sometimes Death itself will be the End,

Of fractured Ribs.

[a] Indeed GOUEY denies that broken Ribs are ever drove outwards; but PETIT *(lib. de Morb. Oss.)* witnesses that there may be such a Kind of Fracture.

[b] All Fractures of different Ribs at the same Time are ranked by BOHN amongst mortal Wounds. *Lib. de Vuln. Leth. C.* 3. And I myself have been Witness to such a Fracture, where the Patient died in a few Hours.

particularly in a Fracture of more than one Rib at the ſame Time. It frequently happens, unleſs the Fracture be a ſimple one, that the ſoft Parts are punctured, and an external Wound made, by ſome ſharp Piece of the Bone. If the Parts are wounded, it occaſions ſometimes a very profuſe Hæmorrhage, often very difficult to ſtop, as the Paſſage is not eaſy to the Arteries beneath the Ribs. And if the Blood ſhould not run into the *Thorax*, it can ſcarce be diſcharged from thence but by the *Paracenteſis*, or elſe by dilating the Wound, when it happens between the baſtard Ribs. If by any external Force the Cartilages ſhould be ſeparated from the Ribs, we term it a Fracture, and treat it in the ſame Method with other Fractures in this Part, which we are going to deſcribe.

The Method of diſcovering a Fracture of the Ribs.

II. When the fractured Parts of a Rib keep in their natural Situation, they continue even and ſmooth to the Eye, and are unaccompanied with any conſiderable Pain: It is therefore difficult to diſcover the Fracture. But yet, upon ſlightly moving the ſame, it will be attended with ſome Pain, though it will the more readily grow together. But when the fractured Parts recede from each other, the Deformity will be apparent both to the Eye and Touch, and a Noiſe will be heard upon moving them. If a ſharp Piece of the Bone ſhould moleſt the *Viſcera* internally, it will occaſion the greater Part of the Symptoms mentioned at *N.* I. and from the Intenſity and Malignity of thoſe, we judge the Fracture to be more or leſs dangerous. But it alſo frequently happens, that a Fracture of the Ribs occaſions a windy Tumor, called by the Greeks, *Emphyſema*; formed by the Air inſinuating itſelf, by a ſmall Wound, between the Skin and Muſcles, into the Subſtance of the cellular or adipoſe Membrane; ſpreading itſelf afterwards up to the Neck, Head, Belly, and other Parts, much after the Manner in which Butchers blow up their Veal.

How a ſlight Fracture of the Ribs is to be ſet.

III. In order to replace fractured Ribs, it is always previouſly neceſſary to inquire whether the Splinters project externally or internally. When the firſt is the Caſe, the Patient is to be placed on a high Table, and the ſeparated Bones muſt be gently forced by the Fingers into their Places, the proper Compreſſes dipped in *Spir. Vin.* muſt be laid on, and then covered with Slips of Paſte-board or Splints; and laſtly, the circular Bandage, or elſe the *Napkin-and-Scapulary*. But when the latter is the Caſe, while the Patient retains a deep Breath, the Surgeon carefully compreſſes both Sides of the Rib with his Hands, agitating till they are properly fixed. What is farther neceſſary to be done in this Caſe, will come under the Head of Bandage; unleſs that the Paſte-board is to be here omitted, and the Napkin not drawn very tight: But the Dreſſing need not be undone, unleſs it be over looſe, and ſome Symptoms or the Patient's erect Poſture require it. By theſe Means, Fractures of this Kind are uſually cured in about three or four Weeks Time. Through the whole Courſe of the Cure, as CELSUS (*Lib.* VIII. *Cap.* 9.) adviſes, the Patient muſt carefully avoid all Talk and Clamour, Paſſions and Anger, violent Motions of the Body, Smoke, Duſt, and every thing that will occaſion ſneezing or coughing. But if the Reduction cannot be effected by the Means hitherto delivered, it may not be improper to try by ſome ſticking Plaſter, as in a Depreſſion of the *Cranium* at *Book* I. *Chap.* XIV. *N.* XXIV.

What is to be done in the more dangerous Fractures of the Ribs.

IV. If any ſharp Pieces of the Ribs ſhould pierce the *Pleura*, it will occaſion moſt violent Pains, a Difficulty of Breathing, a Cough, Spitting of Blood, Inflammation,

flammation, Fever, and other ſuch grievous Symptoms: Therefore it will be proper to open the Skin and extract the Fragments which ſtick in the Fleſh with the Fingers, Plyers, Hooks, or other proper Inſtruments. Unleſs this Method be followed, the Patient will be in great Danger; to prevent which, Phlebotomy, Clyſters, cooling and Anodyne Medicines are to be uſed, and a thin Diet muſt be followed. This Method of Inciſion is alſo more particularly neceſſary when the ſticking Plaſter, and other Means adviſed, prove inſufficient to reduce the Fracture.

Of the Veins and Arteries hurt.

V. When there happens to be a Wound of any of the Veins or Arteries which run under the Ribs ſo as to let their Blood flow internally, the Caſe will be much the ſame with the Wounds mentioned in *Book* I. *Chap.* X. And it ſeems then neceſſary to open the *Thorax* near the fractured Part, ſufficient to admit the Finger, anointed with ſome Liniment, and dipped in ſome ſtyptic Medicine, which is to be held upon the Veſſels till the Blood ſtops. But when the Finger proves ineffectual, the divided Veſſel muſt be diſcovered, and cloſed either with a Ligature or an actual Cautery, properly applied. And in order to diſcharge what is lodged in the Thorax, when the Wound itſelf is in the lower Part thereof, the Surgeon muſt dilate and keep it open with Lint, as was adviſed before in Wounds of the Thorax. But when the Height of its Situation in the Breaſt, near the upper true Ribs, will not admit of a convenient Diſcharge by that, a freſh and more convenient Opening or *Paracenteſis* muſt be made in the lower Part of the Thorax; and the Wound in the ſuperior Part muſt be cloſed. See *Book* I. *Chap.* X. *N.* X.

How the *Emphyſema* and Contuſion are to be treated.

VI. When an *Emphyſema* happens, it will be very proper to inlarge the Opening in the Skin, if too narrow, with the Scalpel; and to bring down the Tumor with Frictions and Bandage, carrying the Compreſſion gradually towards the Opening, ſo as to expel the included Air by Degrees. But if there ſhould be a Contuſion alſo, it muſt be treated in the Method which we have already laid down, in the Chapter (XV. *Book* I.) of *Contuſions*. If a violent Cough or Inflammation follow, it muſt be remedied by Bleeding, and other proper Medicines. See an Example in LE DRAN, *Obſ.* 29. *Tom.* I.

Fractures of the *Vertebræ*.

VII. When any of the *Vertebræ* are fractured, either by a Fall, Blow, or any other Cauſe, without hurting the ſpinal Marrow; we may reaſonably ſuppoſe that the Fracture is confined to ſome of the oblique or ſpinal Proceſſes; and therefore the Patient will be in no great Danger. But when the Body of the *Vertebræ* is either broke or ſplit by ſome external Force[a], and the contiguous ſpinal Marrow bruiſed or compreſſed; all Parts of the Limbs and *Viſcera* beneath that Vertebra become immoveable and rigid. No wonder then, if a ſpeedy or ſlow-paced Death often follows, in proportion to the Degree of Damage. Here it may be alſo proper to recal to Mind, what has been ſaid in the preceding Book, on Wounds of the *Medulla Spinalis*. And laſtly, if the tranſverſe Proceſſes of the *Vertebræ* are broke, which incline towards the Cavity of the *Thorax*, it is ſcarce poſſible that the Heads of the Ribs which are there connected, ſhould eſcape being fractured alſo; which makes the Caſe very deplorable.

[a] GOUEY thinks the Body of the *Vertebræ* cannot be fractured, unleſs by a Bullet: But I have ſeen them from a violent Fall off a high Place, and the Patient died ſoon after, from bruiſing the *ſpinal Marrow*; as they generally do in this Caſe.

The Signs of Fractures in the *Vertebræ*.

VIII. Fractures in the *Vertebræ* may be judged to be preſent from (1) conſidering the Nature of the external Violence, whether it be a great Fall, Blow, or the like; but more eſpecially (2) from the Pains ſeated about the affected *Vertebræ*; and laſtly (3) from the Manifeſtation thereof, to the Touch, Eye, and Ear.

How to replace the fractured Proceſſes or *Apophyſes*.

IX. When only the Proceſſes of the *Vertebræ* are found broken, it will be much the beſt Way to force them into their Places with the Fingers, placing narrow Compreſſes dipped in warm Spirit of Wine on each Side the *Vertebræ*, and over them, Slips of thick Paſte-board, to be kept on by the *Napkin-and-Scapulary*. For by this Means, the Bones of the *Vertebræ*, which are very ſoft and ſpungy, will quickly and eaſily grow together again.

How the worſt Kind of Fractures in the *Vertebræ* are to be treated.

X. If in any Caſe the Spinal Marrow ſhould be divided, Death will be generally an inevitable Conſequence. But to offer the Patient no Aſſiſtance becauſe we deſpair, would ſeem cruel and uncharitable; therefore we muſt try our Skill, though our Attempt ſhould be in vain: In order to which, the Surgeon muſt lay bare the fractured *Vertebra* with a Scalpel, and replace or elſe remove ſuch Fragments as injured the ſpinal Marrow. The Wound is to be afterwards gently cleanſed as uſual, and dreſſed with the Balſams mentioned *Book* I, *Chap.* II, *N.* XV, clapping over them a Compreſs dipped in warm Spirit of Wine, or Lime-water, and Spirit of Wine camphorated, to be held on with the *Napkin-and-Scapulary*, till the Wound ſhall terminate either in a perfect Cure or Death.

Fracture of the *Os Sacrum*.

XI. It ſometimes alſo happens, that by a Fall or a Blow, the *Os Sacrum* becomes in like Manner fractured; which may be diſcerned to be broken, from conſidering the external Violence, the Pains, by the Touch, *&c.* as is uſual in other Fractures.

How to ſet a Fracture of the *Os Sacrum*.

XII. As ſoon therefore as the *Os Sacrum* is found to be fractured, its Fragments are to be forced into their Places with the Fingers. But if any Part of it be depreſſed inwards, it may be convenient to introduce a Finger (that has firſt had its Nail cut cloſe and been dipped in Oil or Butter) up the *Anus*, in order to thruſt the depreſſed Fragment into its proper Place, to which it is to be directed externally by the other Hand. This being performed, we muſt apply ſome Plaſter ſuitable for Fractures, with Compreſſes dipped in *Sp. Vin.* over it, to be kept on by the T Bandage; or the Plaſter may be omitted and only the Compreſs and Bandage retained. And laſtly, to facilitate the Agglutination, the Patient ſhould keep his Bed quietly on his Sides for about a Fortnight: Or if he muſt needs ſit at Times, let it be in a Chair without a Bottom, to avoid diſplacing of the Bone, from touching the Seat.

How the *Os Innominatum* is to be replaced.

XIII. When the *Os Innominatum* is broke, which ſeldom happens, it is readily diſcovered by the Injury and Symptoms in the neighbouring Parts, and is more particularly dangerous when the Patient diſcharges a brown and bloody Matter. In reſtoring this Bone, the Patient muſt lay down on his ſound Side, the Bone is to be replaced with the Hands, covered with Compreſſes, dipped in *Sp. Vin.* and bound up with the Bandage *Spica*. Afterwards Bleeding, with cooling and relaxing Medicines muſt be uſed, and a thin Diet obſerved; and let the Patient lie either on the ſound Side, or on his Back [a].

[a] See ROONHUYS, *Obſ.* p. 142. *Edit. Belg.*

CHAP.

CHAP. VII.

Of FRACTURES *in the Bones of the* Humerus, Cubitus, *and* Hands.

I. THE *Os Humeri* is broke either in its Middle, which is the leaſt dangerous; or elſe near its upper or lower Head, which is much worſe, as being more difficult to cure, and producing more violent Symptoms, acute Pains, Tumors, and Inflammations. Indeed Fractures of this Part are uſually very obvious to the Senſes, being expoſed to the Eyes and Hands: But then they require a different Treatment, according to the particular Part injured. It ſometimes alſo happens, that the fractured Parts of this Bone keep their Places: But it more frequently falls out, that they ſlip one over the other; by which Means the fractured Limb becomes ſhorter than the ſound one. But it will ſometimes, though ſeldom, happen, that the two Parts of the Bone ſhall recede much from each other; by reaſon of the Weight of the Arm, which they ſuſtain. If the firſt be the Caſe, the Fragments are uſually more eaſily and readily replaced; but in the latter, there is required more Force and Skill to reduce the Bones to their Places, from whence they were removed: Eſpecially if the Patient has tenſe Nerves and large Muſcles, as is uſually obſerved in ſtrong Men. Fracture of the Humerus or Fore-Arm.

II. In a Fracture of the *Os Humeri*, the Arm may be readily extended in the following Manner: Let the Patient be ſeated on a high Stool, and an Aſſiſtant lay firm hold of his Arm above the Fracture, keeping his Elbow gently bended: Then the lower Part of the Arm, beneath the Fracture, is in like manner to be taken hold of, and the Arm is to be gently extended forward, by endeavouring to remove eaſily each Part from the other in a right Line. Then the Surgeon himſelf lays hold of the fractured Part of the Arm, with both his Hands, and ſtrives to replace the Bones, held in a due Extenſion by the Aſſiſtant, into their proper Situations; judiciouſly rolling up the Part with proper Bandages, agreeable to what has been ſaid of them in general in the Introduction, and what we ſhall explain more at large in the particular Doctrine of Bandages alone. If one Aſſiſtant be not able ſufficiently to extend the Arm of a robuſt Patient, the Office may be undertaken by two; or elſe thin Napkins or other Linen Bandages may be wound round each Articulation of the Arm, and given to ſeveral Aſſiſtants, to be pulled in oppoſite Directions, till the Limb be ſtretched a little longer than it naturally ought; and then the Surgeon is to replace the Bones: But if the Surgeon's Hands and Napkin prove inſufficient, which is ſeldom the Caſe, HILDANUS's Girt, with the Sling (as deſcribed, *Plate* VIII, *Fig.* 17.) muſt be applied to the Arm above the *Cubitus*; by which you may extend it, and reduce the Bone to its proper Situation. How a broken Arm is be ſet.

III. The lower Part of the Arm, called by Anatomiſts *Cubitus*, contains two Bones; the *Radius* and the *Ulna*. A Fracture in this Part may therefore happen to only one, or to both of theſe Bones; and that, either in their Middle or Extremities. But when they are both broke together, the Bones are not only very eaſily diſtorted from each other, but are alſo replaced and joined together again with much more Difficulty. But if one only ſhould be broke, whilſt the other Of Fractures in the Cubitus, or Lower Arm.

other remains whole, the fractured Parts do not much recede out of their Places, nor are they very difficult to reduce and retain. For the ſound Bone is found to be a better Direction and Support in this Caſe, than either Splints or Bandages. When the Fracture happens towards the lower Head, near the *Pronator quadratus* Muſcle, the fractured Part is ſtrongly drawn (by that Muſcle, and the intervening Ligament that is ſpread between the *Radius* and *Ulna*) towards the ſound Bone, which makes it more difficult to replace. This is therefore a very material Circumſtance to be conſidered in the *Prognoſis* and Cure of this Fracture.

The Signs of a Fracture in the *Cubitus*.

IV. A Fracture in theſe Bones of the Arm may be well enough diſcovered by the Signs common to Fractures in general. But whether one or both be broke, and which of them is the Bone and its particular Part fractured; theſe may be known by the Sight and Touch, and by properly moving the Joint in or out, as may be neceſſary. It is however much eaſier to diſcover a Fracture in the *Ulna*, from its Inability to ſupport the Joint, as uſual, than that of the *Radius*. The Ear will alſo frequently aſſiſt the Sight, in the Search after this Fracture: For there will be generally perceived a Grating of the Bones, upon moving the Patient's Hand in and out, whilſt the upper Part of the *Cubitus* is held firm.

In what Manner the *Radius* is to be ſet.

V. If the *Radius* is to be ſet or replaced, whoſe Fragment is contracted towards the *Ulna*, an Aſſiſtant muſt hold the Arm whilſt the Surgeon inclines the Patient's Hand towards the *Ulna*, to draw back the contracted Part of the *Radius*. When this is done, he muſt carefully reduce them by Compreſſion on each Side with the Palms of both his Hands, ſo as to reſtore the compreſſed Muſcles, between the *Radius* and *Ulna*, and Fragments of the *Radius*, to their proper Places. The Arm is to be then bound up in the Method we ſhall hereafter deliver. And the Limb is to be put into a ſort of Caſe, (*Tab.* VIII, *Fig.* 14.) made of Paſteboard or light Wood, to be ſuſpended in a Sling put about the Neck[a].

How the *Ulna* is to be replaced.

VI. In ſetting a Fracture of the *Ulna*, the ſame Method is to be obſerved with that of reducing the *Radius* as before, binding and ſuſpending it in the ſame manner: But there is this Difference neceſſary to be obſerved, that in the Extenſion the Hand muſt be bent towards the Thumb and *Radius*, before the diſtorted Part of the *Ulna* can be compreſſed into its Place.

How we are to treat a Fracture of both the Bones.

VII. When both Bones of the *Cubitus* are broke, the Method of Cure will be much the ſame with that uſed to each of the Bones, when broke ſingly: Unleſs that there is required more Strength and Circumſpection in replacing and retaining them, and the Bandage muſt be applied with greater Caution. And let the Surgeon, with the Palms of his Hands, compreſs the Patient's Fleſh on each Side of the Arm; by which Means the two Bones will mutually accord in returning to their natural Situation. We muſt be alſo careful to obſerve, that, while the Arm continues a good while without Motion, the Mucilage of the Joint does not harden, or the Ligament become ſtiff, and the Arm or *Cubitus* be thereby rendered immoveable. It will be therefore not improper to unbind the Part every other or third Day, and to move it carefully and gently, a little backward and forward, and ſometimes to foment it with warm Oil or Water; for by this Means, its natural Motion will be eaſily preſerved.

[a] *Vide* SCULTET. *Tab.* LVI. & *infra Tab.* 38. *Fig.* 17.

VIII. The Bones of the Wriſt are ſeldom the Subject of Fracture, on account of their Smallneſs: But it ſometimes happens to them, from the Stroke or Compreſſure of ſome hard or heavy Body. When this is the Caſe, there uſually remain but little Hopes of effecting a Cure. For the Ligaments and Tendons are here ſo numerous, and the Bones themſelves are ſo very ſmall, that it ſeems ſcarce poſſible to reduce them into their Places, or make them grow together again. And on this Account, the Joint of the Hand generally becomes ſtiff and immoveable: Or elſe violent Inflammations, Abſceſſes, Suppurations, *Fiſtulæ*, and *Caries* of the Bones do thence ariſe; which, on account of the Softneſs of the Bones, and the Difficulty of diſcharging the Matter, are ſeldom remedied but by amputating the Hand. Agreeable with this, RUYSCH (*Obſ. Anat. Chirurg. pag.* 10.) among others, inſtances a Fracture of this Kind, which, after three Years Treatment, remained ſtill uncured. Fracture of the Wriſt.

IX. But that the Surgeon may not ſeem to be altogether negligent on his Part, he is rather to try what he can do in the Caſe, than to leave the Patient deſtitute of Help. It will be therefore moſt proper for an Aſſiſtant to lay hold of the Hand and Arm, above the fractured Wriſt, and to extend them as much as is ſufficient, in oppoſite Directions. While this is doing, the Surgeon muſt uſe all his Endeavours to reſtore the Fragments to their proper Places, with his Hands: And after he has very curiouſly reduced the Fracture, it is to be bound up with a ſuitable Bandage. How a Fracture of the Wriſt is to be treated.

X. As the *Metacarpus* is much more ſubject to Fractures than the Wriſt, becauſe its Bones are larger; upon the ſame Account it is alſo more eaſily replaced and cured. There can be hardly a better Method of reducing this Fracture, than that of ſpreading the Hand upon a ſmooth Table by an Aſſiſtant, the Surgeon carefully uſing all his Endeavours to replace the Bones with his Fingers, ſecuring them with a proper Bandage. An Inſtance of a Fracture in the Wriſt with a Wound, may be ſeen in LE DRAN's *Obſ.* 56. *Tom.* I. Fracture of the Hand, or *Metacarpus*.

XI. When one or more of the Bones in the Fingers are broke, the Surgeon's principal Buſineſs is, to carefully replace what has been removed, and to roll up the Finger a little Way with a narrow Bandage, and then to bind it firmly to the next ſound Finger. If the Thumb is fractured, it muſt be ſupported with ſmall Splints, and ſecured with a proper Bandage. The Method of commodiouſly applying the Bandage when ſeveral of the Fingers are broke at once, will be declared hereafter in the Doctrine of Bandages. But when the Hand or a Finger is ſo violently maſhed as to have no Room to expect a Cure, it is more adviſeable to cut it entirely off, than to conſtantly torment the Patient, and perhaps put him in Danger of his Life. Fractures of the Fingers.

CHAP. VIII.
Of a fractured THIGH.

I. THE Thigh-bone, though the largeſt and ſtouteſt in the whole Body, is frequently broke after ſeveral different Manners; and that either in its Middle, or towards its Heads and Articulations: But more frequently near that Part which Anatomiſts call its Neck, near its Articulation with the Hip-bone. Which, whenever it happens, is very difficult to ſet, and more difficult to retain in its Place. When the Bone is broke in two Places at once, the Fracture of the Thighs.

Danger

Danger is ſtill greater: And if the Patient ſhould eſcape Death, which they uſually do not, it is a common Caſe for him to be ever afterwards lame. Sometimes the Bone is broke tranſverſely, ſometimes obliquely; and at other Times the Ends ſlip one over the other, which makes it a very bad Caſe. For the Muſcles of this Part being very robuſt, and ſtrongly contracted, draw the lower End of the Bone with a conſiderable Force upward, ſo as to make it require a conſiderable Strength to extend and replace it. The oblique Fracture more frequently ſlips out of its Place again than the tranſverſe, and generally leaves the Thigh ſomewhat ſhorter than the other, notwithſtanding the Surgeon has performed his Duty with Exactneſs. It is therefore neceſſary to uſe in theſe Caſes, beſides the Means to be hereafter mentioned, a more ſtrict Bandage, than in the tranſverſe Fracture, to prevent the replaced Bones from being eaſily moved.

How a Fracture of the Thigh is to be ſet.

II. In reducing a fractured Thigh, we are to conſider whether the Bone be broke near its Neck, or in ſome other Part: Which Conſideration is always very neceſſary for the better replacing and binding up the Limb. Whenever, then, a Fracture of the Thigh-bone happens, either in the Middle or towards its lower Head, it is to be extended and replaced with the Hands like other Fractures: excepting that the extending Force here required, eſpecially in robuſt Patients, muſt be much greater. Therefore more and ſtronger Aſſiſtants are to be here employed, who are ſufficiently to extend the Limb with their Hands; or, where their Hands will not ſuffice, Slings, Napkins, or Linen Bandages may be bound round each Head of the Thigh, whereby the fractured Bone may be extended both Ways, while the Surgeon cautiouſly reduces the Fracture with his Hands, and treats it with a proper Dreſſing.

The Girt or Belt of HILDANUS.

III. But when the Extenſion cannot be performed effectually by the Hands, Slings, nor Bandages, which is a Caſe that ſeldom happens, we muſt then have recourſe to the Belt or Girt of HILDANUS, *Tab.* VIII. *Fig.* 17. which is to be drawn and buckled very tight above the Knee, being firſt introduced through the Eyes of the Hooks A A, upon which is to be faſtened a ſtrong and ſmall Rope B B, about the Middle, C, whereof are to be applied the Hands of the Aſſiſtants, or Napkins, *&c.* by which Means a ſufficient Extenſion may be made, in order to replace the Fragments in their former Situations. Nor is this Contrivance reſtrained to the lower Limbs only; for it may be applied upon Occaſion, to extend Fractures of the *Humerus* and *Cubitus*. If a fractured *Cubitus* is to be extended, the Girt is to be faſtened above the Hand; if the *Humerus*, above the Elbow.

Of the compound Pulley, or *Polyſpaſton*.

IV. If the laſt Method of Extenſion ſhall prove ineffectual by itſelf, it ſeems every way neceſſary to try if any thing can be done more to the Purpoſe by the Pullies of *Tab.* VIII. *Fig.* 15. The Hook A, of one Pulley, is to be faſtened upon the Rope of *Fig.* 17. at its Part, C; the Hook of the other Pulley B, is to be hung upon the Ring A, of the Hand-ſcrew B, of *Fig.* 16; which is to be firſt ſcrewed tight into ſome Beam or Rafter. Then, the Patient being held firm, about the other Head of the fractured Limb, by Means of Slings, Napkins, or other ſtrong and long Linen Bandages, to prevent his giving way to the Extenſion; the Rope C, put through the Pullies D, and E, of *Fig.* 18. muſt now be drawn through, till the Thigh-bone be ſufficiently extended, ſo as to admit of a convenient Reduction thereof by the Surgeon. Here it is to be obſerved, that the more Wheels the Rope paſſes round in the Pullies D, and E,

of

of *Fig.* 18. the more eaſily and gradually will the Extenſion be performed, inſomuch that by this Inſtrument one Man may draw more than ten without it.

A Fracture in the Neck of the Thigh-bone.

V. When the Neck itſelf of the Thigh-bone is broke, to which, from its oblique or tranſverſe Direction, and ſpongy or brittle Subſtance, it is very ſubject; it makes a Fracture not only very difficult to reduce, but ſuch a one alſo as can be ſeldom cured without leaving the Limb lame or ſhorter than the other, as HILDANUS, (*Cent.* V. *Obſ.* 86.) RUYSCHIUS, and others teſtify. Now the Reaſons for this Calamity are more than one. For (1) the Fragments cannot, but with great Difficulty, be preſſed into their right Places, by Reaſon of the great Thickneſs and Strength of the Muſcles which cover them. (2) It ſeldom happens that the Bones can be retained in their natural Poſition, after they have been very well ſet: Becauſe the Muſcles, which paſs over and are inſerted a little below the Neck of this Bone, draw its lower Part upwards. And both theſe generally happen the more eaſily, (3) becauſe of the oblique Poſition of the Neck of this Bone, which is inſerted into its Head in a Direction not perpendicular nor parallel, but as it were ſloping on one Side of the ſame: As will evidently appear upon viewing this Bone in a Skeleton. So that we have hence none of us any occaſion to wonder, if Lameneſs and other bad Accidents follow as Conſequences of this Kind of Fracture.

The Difficulty of diſcovering a Fracture in the Neck of the Thigh-bone.

VI. To the foregoing Reaſons we may add, (4) that it is very difficult to diſcover when the Neck of the Thigh-bone is fractured, the Caſe being almoſt always taken for the Head of the ſame Bone being ſlipped out of its *Acetabulum* or Socket: Till firſt PAREY (*Lib.* XIV. *Cap.* 21.) then SCHENCKIUS (*Obſ.* XI, *Lib.* 5.) after them the celebrated RUYSCH [a] (when the Obſervations of the two former were forgot) and, ſince him, ſeveral other eminent Surgeons and Phyſicians [b] have made it very evident that the ſpongy Neck of the Thigh-bone is, and may be oftener broke in two, than its Head, defended by very ſtrong Ligaments, be puſhed out of its deep Socket by any external Violence. Of this conſiderable Obſervation, the Phyſicians and Surgeons of not only former, but even the laſt Age, were ſo generally ignorant, that they never in the leaſt ſuſpected the Caſe to be a Fracture, but treated the Patient as if the Thigh had been luxated, tormenting and miſerably diſtorting the Member with the Machines uſed in that Caſe. Since, therefore, this Method of treating the Patient has been found by Experience to be not only fruitleſs, but barbarous; it is highly neceſſary we ſhould recommend another Practice, and ſuch as might prevent thoſe acute Pains, violent Inflammations, and many dangerous Symptoms which might otherwiſe enſue.

How this Kind of Fracture is to be diſcovered and cured.

VII. When we think the external Force to have been ſufficient to produce a Fracture; when the Patient cannot bear any Streſs upon the Limb by ſetting his Foot to the Ground; when very acute Pains are felt about the Articulation itſelf; and when we find the affected Limb ſhorter than the ſound one, it being an eaſy Matter to turn the Foot almoſt round from one Side to the other, and perceive any cracking or grating of the Bones in that Motion, we may then reaſonably ſuppoſe that the Neck of the Thigh-bone is fractured. We muſt

[a] In *Theſaur. Anat.* VIII. *Tab.* III. *Fig.* 1. and *Theſ.* IX. *Tab.* I. *Fig.* 1.

[b] CHESELDEN, *Anatom.* upon the Bones of the lower Extremities, and in *Tab.* VI. G, H. DOUGLAS, *Philoſoph. Tranſact. N.* CCCLXXXI Ann. 1716; and PETIT, on *Diſeaſes of the Bones.* SALTZMAN, *Diſſert. de Fractura Femoris frequentiori*, and others.

then carefully avoid the violent Extenſion of the Limb, which was uſed formerly under the Notion of a Luxation, by the Inſtruments contrived by SCULTETUS, and others, for that Purpoſe. Our Buſineſs here is, to extend the Limb very gently and gradually, till the diſordered Limb be of the ſame Length with the ſound one; and this by Means of a Napkin, proper Slings, or the Hands of a ſtout Aſſiſtant faſtned round the Foot, or elſe by the preceding Girt and Pulley: In a Manner by which we may be able to rejoin, in ſome Meaſure, if not perfectly, the Neck of the Thigh-bone with its Head ſtill firmly adhering in its Socket. And though a Shortneſs of the Limb, or Lameneſs is generally left behind after this Fracture; yet becauſe there are ſome cured without thoſe Attendants, I muſt approve, as very uſeful, ſuch a ſtrict Bandage as may apply and retain the Neck to the Head of the Bone, ſo as that they may gradually grow together again. For which Purpoſe, we uſually apply the Bandage called *Spica inguinalis*, in this Caſe; then a large and broad Linen Cloth or Napkin is placed between the Thighs, to keep the Body of it from ſubſiding; and laſtly, Ligatures are put about the Knee and Ancle, whereby the Foot is faſtened to the lower End of the Bed, with a little Pad of Straw, to prevent the Limb from being contracted upwards: But we ſhall deſcribe all this more at large, when we come to the Doctrine of Bandages. Indeed PETIT teaches, that this Kind of Fracture is to be bound up ſimply in the ſame Method with other Fractures of the Thigh; but that this is not reaſonable, the Experienced herein will readily allow. Having proceeded thus far regularly, and placed the Patient in as convenient a Poſture as poſſible, we muſt all along obſerve, with a ſtrict Eye, whether the afflicted Member be either equal or ſhorter than the ſound one. If it ſhould be found to become ſhorter, there will be great room to ſuſpect that the Neck of the Thigh-bone is ſlipped out of its Place again: And therefore it muſt be gently extended again, after unbinding it, till it becomes of the ſame Length with the ſound one as before. But when the Foot of this continues of the ſame Length with that of the ſound Limb, there is great room to hope that the Patient will be happily cured; if continued Reſt and a proper Diet be regularly obſerved. What remains, is to be left to Nature.

How ſuch a fractured Thigh is to be retained in its proper Situation.

VIII. If we had an Inſtrument that would keep the fractured Thigh properly extended and of the ſame Length with the ſound one, for about fourteen Days, or till the Cure was perfect, we could go on with much more Certainty and Succeſs, in the Cure of Fractures in the Neck of the Thigh-bone, than we do. He therefore would be Author of a no ſmall but important Advantage that ſhould contrive a Machine fit for this Purpoſe. For though HILDANUS has deſcribed (*Cent.* V. *Obſ.* 86.) an Inſtrument proper for extending Thighs which are obliquely fractured; there is yet great room to doubt of its Fitneſs for this Kind of Fracture. For he does not, that I know of, ſupply us with any Inſtances of Extenſions or happy Cures that have been made by this Inſtrument. But till we have a more proper Machine contrived, and when the other Means are not found of themſelves ſufficient, it will not be amiſs to uſe the forementioned Inſtrument of HILDANUS; or, when that is alſo of itſelf inſufficient, to add the Straw-pad, the large four-headed Bandage, and the reſt of the Apparatus deſcribed by HILDANUS; or to bind two long Napkins about each Groin, faſtening them by Nails or Rings to the Head-bed-poſts or Sides, ſo as to retain the Patient's Body ſufficiently firm from deſcending. But that the lower

Part

Part of the Limb may not give Way upwards, a Ligature or Bandage is to be put round the Knee and Ancle, to be faſtened to the Bed's Feet, as we obſerved at § VII. by which means the Limb may be retained in its proper Poſture till the broken Neck of the Thigh-bone be joined firmly together. The ſame Method of Binding and Retaining may be alſo uſeful in other Fractures of the Thighs, but it is found not only uſeful, but really neceſſary in oblique Fractures of this Limb. But to prevent the Napkins or Ligatures from galling the Groins, it may be ſometimes proper to interpoſe ſoft Compreſſes or Lint; and for Advice concerning the proper Poſture in which a broken Thigh is to be retained, beſides what has been briefly ſaid at *Chap.* I. *N.* XXXVI. we ſhall be more full and particular in the Doctrine of Bandages[*].

A Fracture of the Thigh with a Wound.

IX. If a Fracture of the Thigh be accompanied with a Wound, it makes the Caſe very dangerous and difficult to cure: And if theſe Accidents ſhould happen to be inflicted on the neighbouring Joint, Death is generally the Conſequence; more eſpecially when any of the large Blood-veſſels are wounded, as muſt be evident from the great Hæmorrhage. So alſo is the Fracture dangerous, when the Wound is ſeated in the back Part of the Thigh; becauſe it is with great Difficulty to be cleanſed and dreſſed.

Cure.

X. In theſe Fractures with a Wound, the eighteen-headed Bandage, *Tab.* IX. *Fig.* 4. is to be uſed for the Dreſſing: This is deſcribed at large in our third Part, upon Bandages. But if the wounded Part be very much contuſed, ſo that extravaſated Blood be lodged under the Skin and about its Interſtices, it is to be carefully opened by ſeveral Inciſions of a ſufficient Depth, that the extravaſated Blood, which would, in a ſhort Time putrify, may be by this means diſcharged. The injured Parts are to be afterwards waſhed with *Aq. Calcis* mixed with a fourth Part of *Sp. Vin. Camph.* or ſome ſuch reſolving Liquor, till the contuſed Parts are digeſted.

When accompanied with Hæmorrhage.

XI. When this Kind of Fracture is accompanied with Loſs of Blood, which is not very violent, nor the Bone near, the Wound is to be dreſſed with dry ſcraped Lint, properly folded, ſo as to fill the Wound: More and larger Compreſſes are to be laid over theſe, and the whole is to be retained with a proper Bandage, as is uſual in Hæmorrhages. But if the Flux be greater, we recommend the Uſe of aſtringent Liquors, ſuch as are uſed to ſtop the Hæmorrhages of Wounds, eſpecially the moſt highly rectified Spirit of Wine, which is here found to be extremely ſerviceable and effectual: But if it run ſtill more vehemently, from an Artery, the Veſſel is to be firſt diſcovered by the *Tournequet*, and afterwards ſecured by Ligature. When this Kind of Fracture is attended with very great Hæmorrhage, and a violent Splintering of the Bone from Gun Shot, ſo as to indicate the crural Artery to be lacerated; if our Deſire is ſincerely to ſave the Life of the Patient, our beſt Method will generally be, to amputate the Thigh and tye up the Artery in Time: For by this means the Patient will be more eaſily preſerved, than if we ſtrive to ſave the lower Parts of his Limb; for the crural Artery is ſo large that it ſeldom grows together, and if it does, the lower Parts are ſoon ſeized with a Gangrene. After the Blood is ſtopped and the Wound cleanſed, the Fragments of the Bone may

[*] In ſimple Fractures of the *Femur* or *Tibia*, the eighteen-headed Bandage may be properly applied.

be replaced, and the Limb carefully bound up with Compreſſes, Splints, and the Bandage with eighteen Heads, defending it in a Caſe of Straw, by the *French* called *Fanons*. The Wound is to be afterwards unbound every Day, cleanſed from its Matter, and dreſſed with ſome digeſtive Ointment or vulnerary Balſam, till it be healed. Inſtances of Fractures of the Thigh with a Wound may be ſeen in SCULTETUS, *Obſ.* 77 and 78. and PURMAN, *Obſ.* 63.

An EXPLANATION *of the* EIGHTH TABLE.

Tab. VIII. explained.

Fig. 1. Is a ſort of large and ſharp *Forceps*, proper to cut off the Splinters or Fragments of Bones, which ſtick out: But to make them cut the eaſier, the Handles ſhould be two or three Inches longer than the Figure.

Fig. 2. Is a ſimple Hook.

Fig. 3. Is a double Hook, ſerving for various Purpoſes in Surgery and Anatomy.

Fig. 4. Is a Needle, for taking up Arteries with a Ligature in Hæmorrhages, and many other Caſes. A, is its blunt Point, B, its Eye tranſmitting the Thread, C, its little Head.

Fig. 5. Is a Caſe to hold the ſubſequent Inſtrument, which is uſed to hold and apply the *Lapis Infernalis*, or Cauſtic Stone.

Fig. 6. The Inſtrument itſelf, made of Steel, for holding and conducting the ſaid Stone. *a*, the Nippers which lay hold of the Stone, *b*, the little Ring which ſhuts and holds them faſt upon the Stone, *c*, the other End of the Inſtrument uſed as a ſticking Quill to ſupport the Lips of Wounds.

Fig. 7. Exhibits the Figure of a Splint, made of thin Wood or Paſte-board, to be uſed in Fractures of the Arms and Feet: Its Breadth ſhould be about three or four Fingers, and its Length ſuitable to the Size of the Limb.

Fig. 8. Is a Paſte-board Splint, ſuch as is ſometimes uſed in Fractures of the Noſe: Its Size is to correſpond to that of the Noſe.

Fig. 9. Is a Splint of Cap-paper, ſuited to the lower Jaw, when fractured only on one Side.

Fig. 10. Is a double Splint of the ſame Kind, for the lower Jaw, when fractured on both Sides: It is to be applied ſo that the Aperture (*a*) in the Middle may let in the Chin: But its two Extremities or Wings (*b b*) which may be folded together in the Middle (*a*), are to be applied towards the Ears.

Fig. 11. Is a Compreſs, in Form of an X, to be uſed in Fractures of the Clavicle.

Fig. 12. Is a Paſte-board Splint, to be laid over the former Compreſs, in the ſame Fracture.

Fig. 13. Is an Iron or Steel Inſtrument in the Form of a T, uſeful to retain the Shoulders in a proper Poſture, in Fractures of the Clavicle. AA, its tranſverſe Part, to which are faſtened Iron Rings, to retain and keep back the Shoulders. B, its perpendicular Part going down the Back. C, an Aperture in its lower End by which it is to be faſtened with a Ligature round the Waiſt, to be tyed before on the Belly. *See Chap.* V. § V. foregoing.

Fig. 14. Is a Paſte-board Caſe, in which a fractured Arm is to be lodged after it has been ſet and dreſſed: Its Size is to be anſwerable to the Arm.

Fig. 15.

Fig: 1.

Fig: 2.

Fig: 3.

Fig: 4.

Fig: 5.

Fig: 6.

Fig: 7.

Fig: 8.

Fig: 9.

Fig: 10.

Fig: 11.

Fig: 12.

Fig: 13.

Fig: 14.

Fig: 15.

Fig: 16.

Fig: 17.

Fig. 15. Is a *Polyſpaſton*, or compound Pulley uſed to extend Fractures, deſcribed before at *Chap.* VIII. § IV. A and B, are two Hooks, by which the Inſtrument is faſtened on both Sides. C, the Rope, by drawing which, an Extenſion is made upon the broken Limb. D, and E, are the two Pullies, conſiſting of ſeveral Wheels, by which the Force of the Drawer is very much increaſed.

Fig. 16. Is a ſtrong Iron Screw, whoſe Worm or Thread B, is to be forced by the two Handles, into ſome Beam or Rafter; and upon its Ring A, is to be hung the Pulley E, foregoing.

Fig. 17. Is the Girt of HILDANUS, ſometimes neceſſary to make Extenſions upon the upper and lower Limbs: AA, two Hooks, upon which is hung the Sling or Rope BB; C being the Place where the extending Force is to be applied. See above *Chap.* VIII. *N.* XIII. The Girt ſhould be three or four Fingers wide, and a Foot and a half long.

CHAP. IX.

Of a FRACTURE *of the* PATELLA, ROTULA, *or* KNEE-PAN.

I. IN order the better to underſtand and cure a Fracture of the *Patella*, it is previouſly neceſſary to learn from Anatomy, the Manner in which it adheres by Means of Ligaments and Tendons to both the Leg and Thigh; where we may alſo obſerve, its Aſcenſion with the contracting Muſcles upwards in extending the Foot, its Deſcenſion upon bending the ſame, and the great Force it ſuſtains both Ways in violent Motions of the Body. When a Fracture of this Bone happens, from a Fall, Blow, or any other external Violence; the Courſe of the Fracture is either longitudinal, tranſverſe, or in ſeveral Directions at the ſame Time: But of all, the tranſverſe Fracture is moſt frequent. The longitudinal happens much ſeldomer, and is more readily cured; becauſe the Fragments in this Caſe, generally keep in their right Places [a]. But when the Bone is broke tranſverſly, and into many Pieces, the Caſe is uſually much more dangerous. For though the lower Part of the Bone keep in its Place, as being not annexed to any Muſcles; yet the ſuperior Part of the Bone is drawn upwards, by the very ſtrong Muſcles to which it is joined, which makes it very difficult to reduce and retain. The Nature of this Kind of Fracture.

II. The Diſcovery of this Kind of Fracture, is uſually Matter of no great Difficulty. For it may be eaſily perceived, by the Eye and the Touch, whether the *Patella* be ſound or divided; and alſo, when it is divided, whether it be broken tranſverſely, longitudinally, or into many Pieces: Whether the Fragments adhere to each other, or are ſeparated at ſome Diſtance. In examining this Fracture, forcible Flexures of the Knee are to be avoided as of no Service, but very painful and pernicious; becauſe by this Means, the Fragments are pulled farther from each other, and PETIT gives an Inſtance of Death occaſioned A Fracture of the *Patella* eaſy to diſcover.

[a] Indeed, GARENGEOT (*Lib. de Inſtrum. Tom.* II. *pag.* 310.) thinks, that this Bone cannot be broke longitudinally; but that this Caſe ſometimes happens, has been ſhewed by PETIT, among many others, in his Chapter of a fractured *Patella*.

thereby,

thereby. But it ſometimes happens, through the Obeſity of the Patient, and the little or no Separation of the fractured Parts, that this Caſe is not ſo ſoon to be diſcovered as is otherwiſe common. But then the Fracture is alſo leſs dangerous; for the Juice of the Bone, of which the *Callus* is formed, cannot ſo eaſily inſinuate itſelf into the Articulation, whereby the Knee would become rigid and immoveable, which frequently happens in ſome Fractures of the Bone.

Prognoſis. III. It is generally a very difficult Matter to make a perfect Cure of this Fracture, as thoſe experienced herein have often found. For if we may believe Practitioners, the Joint is generally left either rigid, or at beſt its Motions are performed with Difficulty. For, beſides the Inſinuation of the oſſific Juice, which was deſtined to the Formation of *Callus*, into the Receſſes of the Articulation; the Mucilage alſo, which lubricates the Joint itſelf, mixes and indurates with it: So that the Bones of the Leg and Thigh being joined together like two Pieces of Wood with the ſtrongeſt Glew, the Joint becomes ſtiff, the Bones grow together and become like one. And this happens the more readily becauſe of the long continued Inactivity of the Joint till the Bone is united, which is extremely neceſſary in theſe, and eſpecially in tranſverſe Fractures; by which long Inactivity, the lubricating *Mucus* of the Joint generally grows thick and hard. But it alſo uſually happens, that the Tendon which ſuſtains the *Patella*, and chiefly directs the Motion of the Joint, is violently contuſed at the ſame Time, and from the ſame Cauſe with the Fracture of the *Patella*: Upon which Account, alſo, the Motion of the Knee is greatly impeded or wholly deſtroyed. We therefore need not wonder that thoſe who have once broke one of their Knee-pans, ſhould be ſo ſubject to frequent Falls, and in Conſequence of them break the other; ſince the violent Contuſion of this Tendon always leaves an incurable Weakneſs in the Joint.

Cure. IV. With regard to the Cure of a fractured *Patella*, it muſt be attempted in the following Method: In a longitudinal or perpendicular Fracture, the Patient muſt be laid upon his Back, and extending his Foot, the Surgeon in the mean Time replaces the Fragments on each Side with both his Hands, binding them up carefully with the uniting Bandage; which muſt be applied here in the ſame Manner with that uſed in large Wounds of the Belly and Fore-head, which we have before taken Notice of, and ſhall deſcribe more largely in the Doctrine of Bandages. But when the *Patella* is broken tranſverſly, or into ſeveral Pieces, the Patient being put in the ſame Poſture and extending his Foot as before: The Surgeon is then carefully to endeavour to bring together, compreſs, and replace the Fragments of the Bone in their natural Situations, with the Palms of his Hands, Thumbs, and Fingers, retaining them firm with the Application of a Plaſter in Form of a half Moon (*Tab.* IX. *Fig.* 2.) or perforated (as at *Fig.* 3.) and then the Foot of the afflicted Member is to be bound up and placed ſo that it cannot be eaſily bent or otherwiſe diſturbed. We intend to be more particular on the whole Buſineſs of the Cure, in the Doctrine of Bandages. But notwithſtanding there are to be found ſeveral particular Machines invented by Surgeons for retaining this Kind of Fracture;

* SOLINGEN recommends an Inſtrument of this Kind in his *Surgery*, in the Chapter of a broken *Patella:* and in *Tab.* XV. *Fig.* 26. *Edit. Amſtel*, 1698. we find the Machine delineated.

GARENGEOT (*Lib. de Inſtit. Chirurg.*) has alſo deſcribed another; and we are acquainted with ſtill more.

they

they all ſeem to be much of ſuch a Make as to fall vaſtly ſhort of being ſufficient for the preſent Deſign. But to prevent the replaced Bone from being diſturbed or broken a-freſh, which is an Accident we find often happens; it muſt be carefully obſerved that the Patient do not any way exerciſe his Leg till after the Expiration of the ninth or tenth Week. For a Fracture of the Knee-pan is ſeldom ſufficiently united before that Time: And ſuch as uſe their Legs before that Time, generally halt in Walking, as RUYSCH (*Obſ.* 3.) obſerves. Further upon this Kind of Fracture, the Obſervation which PURMANNUS has collected in his Surgery (*P.* iii. *C.* 21.) deſerve to be conſulted.

CHAP. X.

Of FRACTURES *in the Bones of the* LEG *and* FOOT.

I. THERE is but little new to be ſaid on Fractures of the Leg and its two Bones, the *Tibia* and *Fibula*, which has not been before obſerved here: So that there is no Occaſion for more than the general Directions, which we have before laid down, to be obſerved in the Cure of every Kind of Fracture: *viz.* that the broken Bones are to be properly extended by the Hands or Slings, and then accurately replaced; to be afterwards properly bound up, and retained in the moſt ſuitable poſture. This I have further to obſerve, that ſometimes both the Bones, and at other Times one of them only are broken: If both, it ſeldom happens that each of them are broke directly in the ſame Place, but one of them a little higher than the other. If the *Tibia* alone be broke, it is eaſily diſcovered, it being placed ſo near the Skin: But if the *Fibula* alone, which is buried under ſo many Muſcles, the Fracture is not ſo eaſy to be diſcerned. And when only the *Fibula* is broke, the Patient is generally under much leſs Diſorder: In ſuch a Manner, that it frequently permits them to walk. But to obtain a proper Knowledge of the Diſpoſition of this Bone when it is fractured, the Calf of the Leg is to be graſped by one Hand, whilſt the other Hand moves the Foot; and in the mean Time the Hand which holds the Leg will perceive whether and where it is fractured. Fracture of the Leg

II. If as it frequently happens, a Fracture of the *Tibia* ſhould be accompanied with an external Wound of the Skin; this muſt be firſt well cleanſed, and the Splinters of Bone, with all foreign Bodies, removed: Then, the broken Bone, after a proper extenſion, may be reduced into its right Place, the Hæmorrhage, if there be any, may be afterwards ſtopped, (as we ſhewed at *Chap.* VIII. § XI.) and the Limb then be bound up firmly with the eighteen-headed Bandage, cut ſomewhat in the form of a Book, as at *Tab.* IX. *Fig.* 4. which we ſhall demonſtrate more fully hereafter in *Chap.* VIII. of Bandages. But if any Fragments of the Bone ſhould ſtick out ſo as to obſtruct its Reduction, they ſhould be firſt removed by a Pair of ſharp *Forceps*, or a fine Saw, before any Attempt be made to reduce or bind up the Fracture. Having proceeded rightly ſo far, the laſt Step is, to place the Limb in a Straw Caſe, or elſe in a Braſs Frame (*Tab.* IX. *Fig.* 9.) purpoſely accommodated to retain Fractures of the *Tibia*; renewing the Dreſſing and Bandage daily, 'till the Wound be healed. Sometimes little Pieces of the Bone will be ſet at Liberty and expoſed to Sight

the Suppuration, in the Courſe of the Cure; which are to be then laid hold of, removed, and the Cure continued as before. An Example of a fractured *Tibia* with a Wound may be ſeen in SCULTETUS, *Obſ.* 82, and 84.

PETIT's Machine for theſe Fractures.

III. A very uſeful and proper Machine or wooden Caſe for retaining the preceding Fracture has been alſo contrived and deſcribed by Monſ. PETIT, a celebrated Surgeon of *Paris*, firſt in the *Act. Acad. Reg. Pariſ. Ann.* 1718. and afterwards in his Treatiſe of *Diſeaſes of the Bones*, from whence GARENGEOT transferred it into his Book of *Chirurgical Inſtruments*. We chuſe to exhibit the Machine rather from the *Act. Reg. Pariſ.* [a] than from the Inventor's *Book on the Bones*, or GARENGEOT's of *Inſtruments*; becauſe in the two latter, the Inſtrument is repreſented only put together, and therefore may not be intelligible to ſome, as if exhibited in a double Light, according to the other. You have it therefore firſt whole or put together, in *Tab.* IX. *Fig.* 11. and then ſeparated into its component Parts at *Fig.* 12. The Baſis or principal Part of the Machine A A (*Tab.* IX. *Fig.* 12.) is to be gently put under the broken Leg (after it has been firſt ſet, the Wound properly dreſſed, the whole bound up with the Bandage of eighteen Heads, and defended with Splints tied on with three Strings, as is uſual.) The two lateral Parts of the Caſe B B, and its Front C, which ſerves as a Sole to the Foot, are faſtened together by the Hinges D D, and kept ſhut by the Hooks E E, as may be ſeen at *Fig.* 11. by which Means the Foot cannot ſlip or ſhake, but is held firm and eaſy to the Patient. F F is the lower Part or Foot of the Machine, ſerving as a Foundation to the reſt. At its End G G, it is joined by Hinges to the preceding Floor A A, whoſe ſloping Part ſlides under the Thigh. Over the Floor A A, Pieces of ſtrong Tape or Ticken are to be nailed tight to the Sides, upon which the Limb reſts eaſier than upon the Plank or Board. The other Parts of this Caſe ſeeming to be very obvious from the Figure, we ſhall, for Brevity, omit any Explanation of them, and only obſerve that its Size is to agree with that of the Limb. But by reaſon of the vaſt Numbers of Fractures which happen in a War, and the great Scarcity and Cumberſomeneſs of theſe Machines at ſuch Times, the Camp Surgeons are generally obliged to ſubſtitute Caſes of Straw in the room of them. At every Dreſſing of the Limb, if PETIT's Machine be uſed, the Hooks EE are to be undone, and the three Sides opened: But when the Wound and Fracture are dreſſed and bound up, the Foot muſt be exactly placed and the Caſe faſtened as before.

Fractures of the Bones of the Feet.

IV. Laſtly, the Bones of the Foot, which compoſe the *Tarſus*, *Metatarſus*, and Toes, are equally liable to Fractures in the ſame Way with thoſe of the Hands: But by reaſon of the great Complication of Nerves, Tendons, Ligaments, and Membranes, Fractures in this Part are uſually attended with Wounds and the worſt of Symptoms, as Inflammations and Gangrenes. The Bones are to be replaced, and the Cure carried on much in the ſame Manner alſo; except the Difference of Bandage, which we ſhall explain when we come to the particular Doctrine of them [b]: This we may alſo obſerve in the general, that Fractures of the Feet, like thoſe in the Hands and Ankles, can ſeldom be ſo

[a] Tho' it is a great Pity that the Author has not there ſubjoined a particular Explication of his Figures by annexed Letters or Numbers; becauſe it is probable that ſome Parts will not be rightly underſtood by many.

[b] See LE DRAN's *Chirurgical Obſervations*, 108.

per-

perfectly cured as to leave no Stiffneſs nor Want of Motion behind, if they ſhould eſcape the Company of an Ulcer, *Caries*, or incurable *Fiſtula*. Which laſt bad Symptoms are often to be remedied by no Means but that of amputating the Member, nor will even that always preſerve the Patient from Death; and the injured Part ſhould be carefully guarded againſt Inflammations and Gangrenes, by proper Medicines; particularly, Fomentations of Lime-water and Spirit of Wine camphorated: Nor ſhould you by any means omit Bleeding and the additional Application of internal Remedies. 'Tis one's Intereſt, therefore, in violent Fractures and Contuſions of this Part, to give timely Intimation of the Danger to the Patient, or at leaſt to his Friends: Leſt the miſerable Condition of the Patient ſhould be afterwards raſhly attributed to ſome Miſconduct in the Surgeon, as they too often are. But if any body be deſirous of a larger Acquaintance with Fractures of the Bones, I muſt recommend to him the diligent Peruſal of the celebrated PETIT's Treatiſe on *Diſeaſes of the Bones*.

CHAP. XI.

Of Bones broken by ſharp pointed Inſtruments, which may be termed WOUNDS *of the* BONES.

I. HITHERTO we have been treating of Fractures of the Bones, occaſioned by blunt Inſtruments. It remains now that we conſider ſuch as are produced by ſharp ones, as Darts, Swords, Spears, *&c.* which may not improperly be called Wounds of the Bones; for which Reaſon few Writers have treated of them ſeparately. For theſe Weapons do not only cut aſunder and ſeparate the ſoft and fleſhy Parts, but do alſo the ſame to the hard Bones, which they divide ſometimes ſlightly, ſometimes greatly, and often they make a Solution equal to a Fracture: But theſe Wounds cannot be inflicted upon the Bones without being attended with a great Variety of Symptoms, which are often very grievous, according to the Size and Depth of the Wound, the Nature of the Part, and the Force with which it was inflicted; as whether the Violence be received in the Head, Noſe, Jaws, Fingers, Hands, Arms, Shoulders, Legs, or Thighs. As therefore the Knowledge of theſe Accidents is of great Importance, and as they require a ſomewhat different Method of Treatment from other Fractures, it was here proper to ſay ſomething in particular of the beſt Method to be taken for their Cure. Wounds of the Bones.

II. But before we proceed to the Method of Cure, it muſt be firſt obſerved, that ſuch ſlight Wounds as do not penetrate deep into the Bone, are generally not ſo very dangerous: Eſpecially if we proceed regularly in the Cure, keeping the Bone covered as much as poſſible with its Integuments from the Action of the Air, and wholly reject the Uſe of fat or oily Medicines, as very prejudicial to the Bones. But when they penetrate deep, wholly divide the Bone and its adjacent Parts, or violently affect any Organ more directly neceſſary to Life, in the Head, Neck, *Spina Dorſi*, and Breaſt, with a Puncture or Diviſion of the larger Veins, Arteries, Nerves, and Tendons of the upper or lower Limbs: The Danger is then much greater, and the Cure more difficult, Death being often the Conſequence. Their *Prognoſis*.

The Method of Cure.

III. In the Cure of these Fractures by sharp Instruments, PETIT inadvertently advises, in his Treatise on *Diseases of the Bones*, though in other Respects a very good Surgeon, "That in this Kind of Accidents in the Bones, if the Solu-"tion be inflicted lengthways, the Lips of the Wound are to be closed toge-"ther, and cured with the uniting Bandage; but such as are inflicted very "obliquely, or wholly transversely, are to be joined together by Suture and "the Bandage that has eighteen Heads." But as this Method is unsuccessful in many Wounds of this Kind, and so might lead young Practitioners out of the Way, it will not be improper here to expound this Matter more fully, and set it in a clearer Light. Indeed in the first Kind of these Wounds I do almost agree with him; especially when they are slight, as when the Skull is not wholly nor deeply penetrated, and without Contusion, nor the Brain much hurt, as we have observed in Wounds of the Head, *Chap.* XIV. *N.* II. But when the contrary of these obtains, we must proceed more cautiously, and in a Method very different, keeping the Wound open with Lint, cleansing it, and when cleansed, healing it with Balsams, as we have observed in treating of Wounds. For by a too speedy Closure of such Wounds, the most violent Symptoms, and often Death itself, have been frequently brought on. So also in the slighter Wounds of this Kind, which are inflicted obliquely or transversly, I do not approve, with PETIT, of using promiscuously the Suture and eighteen-headed Bandage: But on the contrary, instead of a general Use, I think them the most seldom necessary. For I have seen cured by others, and have often cured myself, many of those Wounds in the Bones without the Use of that Bandage or Suture. To make the Thing more apparent by Example; in oblique Wounds of the Head, Forehead, and *Cranium*, which are none of the violent Kind, the Parts may be retained and closed much easier by a Plaster and common Bandage, than by Sutures made with Needles and Thread, as PETIT seems here to direct; and still much less occasion is there for the Bandage with eighteen Heads. But as I have said in the Chapter of *Wounds in the Head*, these are generally more easy to cure by agglutinative Powders, Balsams, and Plasters, whether the Bones wounded be the Jaws, Clavicles, Shoulder-blades, or in the upper or lower Extremities. But when the divided Part hangs down, so as not to be kept rightly rejoined to its Opposite by these Means, the Suture then seems altogether necessary.

Wounds of the Finger Bones.

IV. If the Bones of the Fingers should be thus wounded, or wholly divided by a Sword, so as only to hang by the Skin and Flesh; I have happily cured them, without the Suture and eighteen-headed Bandage, in the following Manner: I first accurately replaced the divided Bone, and retained them joined together in that Posture by winding round a Slip of Plaster, then applied a Compress dipped in *Sp. Vin.* laying over little Splints of Paste-board for the Retention of the broken Bones in their right and natural Posture; and, lastly, I bound up the whole firm with a proper, long, and narrow Bandage, suspending the Hand in a Sling, hung about the Neck for that Purpose. This I left so for several Days, ordering nothing more than for the Patient to keep up to a proper Diet and Rest. At length I carefully undid the Bandage, and tenderly removed the Compress, but not the Plaster, still supporting the Finger in its right Situation; and after cleansing the Wound as well as it would admit, I dropped in some vulnerary Essence, and applying a fresh Compress dipped in

Sp.

Sp. Vin. bound it up again as before. Thus it was again left for ſeveral Days more, and in about every three Days it was dreſſed in the ſame Method, till after the Space of about a Month it was quite firm and well.

Wounds of the Arm and Leg Bones.

V. If either of the Bones of the *Cubitus* is divided, it generally happens to be the *Ulna*, that being moſt expoſed to the Weapon in fighting; nor does it then require either the forementioned Suture or the Bandage: But the Wound being cleanſed, is to be treated with ſome vulnerary Eſſence or Balſam, and with Lint dipped in the ſame Eſſence; after which, are to be laid on in order the Plaſter, Compreſs, and Paſte-board Splints wetted with *Sp. Vin.* which are to be bound round the thick Part of the *Cubitus* near the Wound with a long Bandage, that, as they dry they may accommodate themſelves the better to the Figure of the Part: And laſtly, the Arm is to be ſuſpended in a Sling hung as uſual about the Neck. And thus dreſſing the Wound every other Day, or, in Proportion to the Diſcharge, every Day, a Cure may be brought about without any Suture, which I here judge to be pernicious. But when either of the Bones of the Leg are broke, I do then indeed uſe the Bandage with eighteen Heads, as in other Fractures of the Leg and Thigh; but ſcarce ever the Suture: Becauſe there is ſeldom or never occaſion for it in Fractures of the *Tibia* alone, which is covered with ſcarce any thing more than the Skin: And it is extremely rare that it is required in Fractures of the *Fibula*, unleſs ſome of its large Muſcles are divided. For we ſhould refrain from the Uſe of Sutures as much as poſſible, becauſe they generally excite Inflammation, Pain, Convulſion, and other bad Symptoms; ſo that we cannot approve of their Uſe, but in the greateſt Neceſſity where we perceive the Cure of the Wound cannot be effected without.

Wounds in the Arm and Thigh Bone.

VI. If the Thigh Bone ſhould be cut by a Sword, then the better to cloſe and retain thoſe ſtrong Muſcles, a Suture made with Needles and Thread, as in ſome other Wounds (*Book* I. *Chap.* I. § XXXIII and XXXIV.) will certainly be of Service: The Wound is to be treated in the Method we have there taught, bound up with the eighteen-headed Bandage, and the Limb is to be placed carefully in a Caſe of Straw, as in other Fractures. So alſo if the Bone of the *Humerus* or Arm ſhould be penetrated by a Sword, it ſhould, for the ſame Reaſon, be treated with the Suture as before; yet not dreſſed with the eighteen-headed Bandage, but a long and narrow one, as in other Fractures of the Arm. The Arm is afterwards to be ſupported by a ſhort Napkin, faſtened about the Neck; by which Means the Muſcles will be brought to a more ready Union, and the Cure ſooner and eaſier perfected. When we find the fleſhy Parts are united, the Threads muſt be cut, and drawn out, as in other Sutures; For the reſt, we proceed, as in all other Fractures of this Kind.

Of both the Bones of the *Cubitus* and Leg divided together.

VII. If it ſhould at any time happen that both the Bones of the *Cubitus* or *Crus* are divided, ſo as to leave the Member hanging only by the Fleſh, Skin, and Blood-veſſels, (which is an Accident that very rarely happens without wholly amputating the Limb) then alſo the Suture with the eighteen-headed Bandage is to be applied. But the Suture can be of no Service when the Part is wholly or ſo far cut off as to hang by the Skin, its Nerves and Blood-veſſels being divided; eſpecially when the Part is ſo conſiderable as the Leg or Arm. For in that Caſe it is much the beſt to take the Limb quite off, to ſtop the

violent Hæmorrhage of the Veſſels, as in other Amputations, and to dreſs the Member in the ſame Manner.

Wounds of the Jaw-Bone, Clavicles, and *Scapulæ*.

VIII. When the lower Jaw is ſo cut by a Sword, that the Piece ſeparates much, and cannot be otherwiſe properly retained, then alſo the Suture muſt be brought into Uſe; adding a proper Balſam, Plaſter, Compreſs, and ſuitable Bandage. If the Clavicle, or *Acromium Scapulæ*, ſhould be in like Manner wounded by ſome ſharp Inſtrument, the Treatment and Bandage are to be performed in much the ſame Manner; gently unbinding, cleanſing, and dreſſing every other, or every Day, as we have obſerved in the reſt of theſe Accidents, till the Cure is perfected.

IX. The Hæmorrhage, which in theſe Injuries is often very large, muſt be ſtopped by Compreſſes, Aſtringents, or Ligature upon the Veſſels, according as which may ſeem moſt ſuitable to the Caſe. Gun-ſhot Wounds of the Bones are to be treated in the ſame Manner; or like Fractures. See further on this Subject, *Ch.* III. of *Gun-ſhot Wounds*; and in my Treatiſe of *Wounds of the Bones*.

An EXPLANATION *of the* NINTH TABLE.

Tab. IX. *Fig.* 1. Is a Compreſs folded together by Degrees, called by the *French Compreſſe graduée*, to be applied in Fractures of the Thigh, to make its ſmall Part towards the Knee of the ſame Thickneſs with its other, that the Splints may act more equally upon it by the Bandage.

Fig. 2. Is two lunar Plaſters, to include and hold firm the fractured Knee-pan after it has been ſet.

Fig. 3. A perforated Plaſter for the ſame Uſe.

Fig. 4. Is a Fracture of the Leg, with an external Wound A, to be bound up with the Bandage of eighteen Heads BBBB; which commodious Kind of Bandage ſeems to have been unknown to the Antients.

Fig. 5. Is a Straw Couch or Caſe for a broken Thigh, called by the *French Fanons*, the Letters AAAA denote two Sticks covered with Straw, bound on with ſtrong Packthread: To both Sides of theſe is alſo faſtened a ſtrong Cloth BB, of about two Feet broad, and three long. This Couch is uſually made twice the length of the Thigh, ſo as to reach from the Groin and *Os Ilium* to the End of the Foot.

Fig. 6. Is a Sole of thick Paſte-board or Wood, fitted to the Size of the Patient's Foot: It is to be applied to the Bottom of the fractured Foot, and bound on by the three Tapes *a a a*, to retain or ſtay the Foot in its proper Poſture; whence CELSUS calls it *Mora*.

Fig. 7. Is a quilted Compreſs to be applied between the Foot and the Stay, to be ſoft, and defend it from any rough Action of Paſte-board or Wood.

Fig. 8. Is a ſoft Linen Ring joined to the foregoing Compreſs, to let in and hold the Heel: It is to be faſtened to the Foot by the two Tapes *b b*.

Fig. 9. Is a Braſs Trunk for ſecurely retaining a broken Leg: It conſiſts of three Parts ABC, which are joined by the Hinges 1, 2, 3, 4, 5, 6. The Middle Part B is the Baſis or Chief of the Machine, which, like an hollow Pipe, receives the bound-up Limb: The outer Parts A and C are as moveable Lids

or

Plate 9.

Fig. 1.

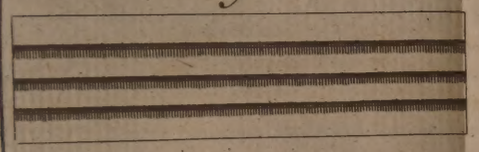


Fig. 2.

Fig. 3.

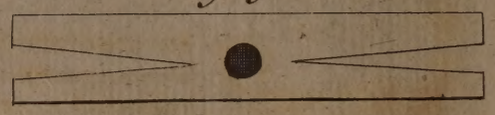
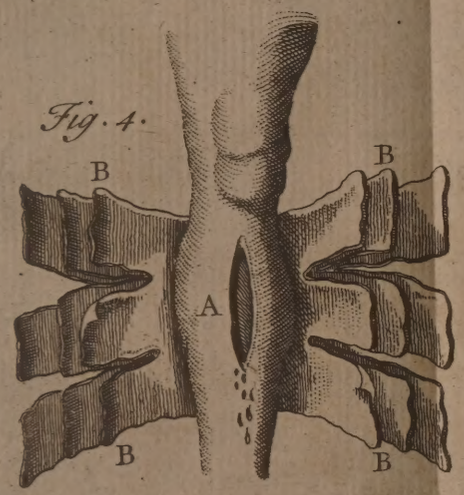


Fig. 4.



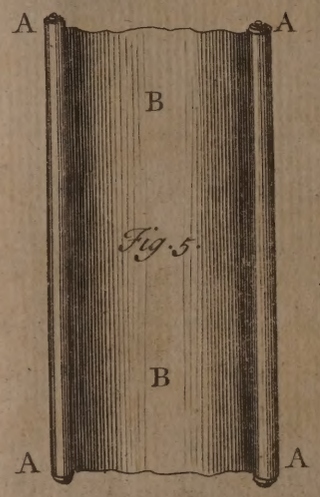


Fig. 5.

Fig. 9.

Fig. 13.

Fig. 7.

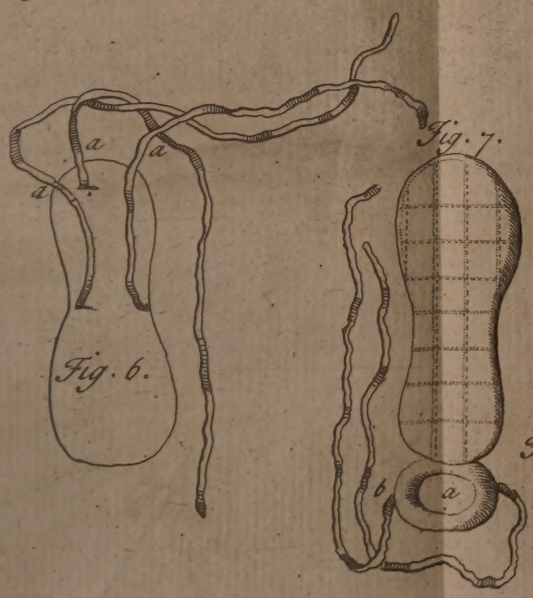


Fig. 6.

Fig. 8.

Fig. 10.

Fig. 11.

Fig. 12.

or Wings, which may be turned back or folded together: To each of these Lids AC, are joined three almost square Loops E E E, through which are passed Tapes to draw them tight together, and keep them firm upon the fractured Leg. Its Size must agree with the Leg.

Fig. 10. Is a wooden Arch to put over a broken Leg, to keep it from being disturbed by the Bed-cloths, *&c.*

Fig. 11. Is PETIT's new Machine Case, (in *French Boette)* or a Box, for retaining a broken Leg, after it has been set and dressed as usual, It is described fully at *Chap.* X. § III. of *Fractures.*

Fig. 12. Is the same in Pieces, to shew its Structure the better. The Letter M denotes the perforated Bracket, which receives the wooden Axle or Hinge H, that it may be elevated or depressed. The rest are sufficiently explained above at *Chap.* X. § III.

Fig. 13. Is a Compress folded at one End, to fill up the Small of the Leg, that the Splints may compress the more equally and firmly.

INSTITUTIONS OF SURGERY.

PART I. BOOK III.

CONCERNING LUXATIONS, or LUXATED BONES.

CHAP. I.

Of LUXATIONS *of the* BONES *in general.*

What a Luxation is.

I. HITHERTO we have treated of Fractures of the Bones. We ſhall now proceed to Luxations, or, according to CELSUS, Diſlocations. We ſay a Luxation or Diſlocation has happened when any Bone is moved out of its Place or Articulation, ſo as to impede or deſtroy its proper Motion and Office. So, for Example, we judge there is a Luxation when the *Acromion* is looſed from the Clavicle, when the Head of the *Humerus* is ſlipped out of the glenoeide Cavity of the *Scapula*, or the Head of the Thigh-bone puſhed out of its *Acetabulum* by ſome Violence, *&c.* So that it hence appears that Luxations are proper only to Bones that have moveable Joints or Articulations; but in a common way of ſpeaking, People term it a Luxation when the Bones of the Noſe are diſplaced, or when *Epiphyſes* are ſeparated from their Bones in Infants, whereby they loſe their natural Uſe. And, indeed, CELSUS has ranked theſe Receſſes of the Bones from each other under the Claſs of Luxations.

What is required previous to their Diſcovery and Cure.

II. From what has been ſaid of Fractures, it may be eaſily concluded what is neceſſary to be done by thoſe who deſire to be happily verſed in the Knowledge and Cure of Diſlocations. Firſt, that they ſhould have a clear Idea and Remembrance of the Form of each Articulation, with their Ligaments and Muſcles: Which may be in ſome Meaſure obtained from accurate Figures in Anatomical Books, but rather from a frequent and diligent Inſpection of the Skeleton and recent Bodies. For the Ligaments and Cartilages which are abſent in the bare Skeleton, may be fully obſerved, in their natural State, in a recent Subject.

III. Luxations

III. Luxations are generally distinguished by Physicians into *Perfect*, and *Imperfect*. The imperfect consists chiefly in this, that the Bones are here dislocated or removed out of their Places but in part, yet so as that they cannot perform their Office. Some are for distinguishing this Kind of Injury by the Name of *Subluxation* or *Distortion*. But the perfect Luxation is, when moveable Bones are wholly separated or displaced from their Articulation with each other: As when the *Humerus* or Thigh-bone is removed quite out of its Socket. In both these Kinds of Luxations the Bone may slip out in several Directions; as externally or internally, behind or before, and above or below. Another considerable Division of Luxations, is, into *Simple* or *Compound*: The latter when besides the Dislocation there is some other bad Symptom, as a Wound, Fracture, Weakness or Straining of the Ligaments, Contusions, violent Inflammation, or the like: But in the first there are none of these. The last Division of these Injuries is into *Recent*, or just inflicted, and *Inveterate*, or of some standing. The more free and moveable the Bone is in its Articulation, the more subject and easy to be dislocated. So that it is no wonder if the Bones of the Arm are oftner displaced from their Articulations with the *Scapulæ* than those of the *Cubitus* and Wrist, and the *Vertebræ* of the Neck and Loins oftner than those of the Back. Of the several Kinds of Luxations.

IV. What we have been saying is in common to all Dislocations. But it remains that we describe every particular Kind of Luxation, beginning with the Head. We may suppose the Head to be luxated when (1.) the Bones of the Nose gape; or (2.) when the lower Jaw stands in or out further than the upper; but it cannot be easily shoved out backward, because hindered by a Protuberance of the *Os Petrosum*; or (3.) when the Head with the *Vertebræ* of the Neck are distorted to one Side, as it may have been sometimes observed by the Surgeon; or, lastly, (4.) when the Bones of the *Cranium* are forced apart by violent Pains, Fever, or Dropsy in this Part. Luxation of the Head.

V. Tho' all the *Vertebræ* which compose the Spine have a proper Motion, they are none of them easily removed wholly out of their Places, so as to make a perfect Luxation. But the *Vertebræ* of the Neck are much easier displaced than the rest, because smaller and more moveable; tho' these are generally connected very closely and strongly to each other and the larger *Vertebræ*. So also the *Vertebræ* of the Loins are extremely difficult to dislocate, tho' more moveable than those of the Back, being separated by thicker Cartilages, and without Sinuses. Lastly, the *Os Coccygis* may be shoved outwards in hard Births, and is sometimes displaced and bent inward by a Fall or the Force of some other hard Body: By which means it presses on the *Rectum*, and very bad Symptoms follow. Luxation in the Spine.

VI. As the Breast is made up of various Bones, so it is also subject to various Luxations. Thus the Ribs may by some violent Blow or Fall be shoved from their Articulation with the *Vertebræ* into the *Thorax*, to the great Damage of the Breast and Lungs. Sometimes it happens that the ensiform Cartilage, at the Bottom of the *Sternum*, is depressed or thrust inward by some Violence, so as to greatly afflict the Stomach[a]. The Clavicles are also sometimes dislocated Luxations of the Breast.

[a] See CODRONCHIUS, *of Diseases reigning at Imola*, &c. An. 1602. and a new Distemper, called, *The Depression of the ensiform Cartilage*. *Bonon.* 1603.

at

at one or both their articulated Heads, those joined to the *Sternum*, and those to the *Scapulæ*, but mostly the first: Which, whenever it happens, the Arm hangs down unsupported, and its Motion obstructed.

Luxation of the *Humerus*.

VII. If any one Bone is to be easily dislocated, it is that of the *Humerus*, partly because its Head is not lodged in any deep *Sinus*, and partly from its very ample and free Motion. It may be forced out either before, behind, or downwards; but never upwards, without breaking the *Acromion* or coracoide Process; for these confine down the Head of the *Humerus* very firmly above. Though the *Cubitus* does, at times, undergo various Luxations, it can seldom happen unless the Violence be great: And then it usually suffers only an imperfect Luxation; from the Shortness of the Ligaments, the Deepness of the Articulation, and its external as well as internal Defence with Ligaments. For the *Cubitus* to be luxated forwards is hardly ever the Case, being prevented by the Protuberance, *Olecranon*: But then it easily and frequently slips out backwards; as from duly considering the Articulation will be very apparent.

Luxation of the *Cubitus*.

Luxation of the Hand.

VIII. The Wrist is very seldom dislocated from the Bones of the *Cubitus*, and hardly ever suffers more than an imperfect Luxation, from the Shortness and Strength of its Ligaments. But if it should be luxated, it will much easier slip out backward and forward, than inward and outward. The Reason of which is not difficult: For there is a bony Process on each Side the *Carpus*, where it is articulated to the *Radius* and *Ulna*, which defends it from being easily displaced. Sometimes the small Bones of the *Carpus* are subluxated among themselves, whence generally arises an Extension and Stiffness in the Hand. In like Manner may the Bones of the Fingers be displaced; but then they are more easily reduced and cured.

Luxation of the Thigh.

IX. Among Luxations of the lower Extremities, that of the Thigh-bone comes first to be considered. The Head of the Thigh-bone may be forced out either upwards, downwards, forwards, or backwards: But which of these Ways it happens to be displaced, may be determined generally from the Touch, and from the different Direction and Length of the Limb. What we have before taken Notice of (*Book* II. *Chap.* VIII. *N.* VI.) is also here worth fresh Observation; *viz.* that the Head of this Bone is not near so often pushed out of the *Acetabulum* by some external Violence, especially in grown Persons, as is commonly suspected. For the modern Surgeons, contrary to their strong Opinion of a Luxation, have generally found a Fracture in the Neck of the Thigh-bone. Nor is this to be wondered at: Since the Head of this Bone is articulated into so deep a Socket, and secured by such strong Ligaments, that it cannot be dislocated in a dead Subject by the strongest Man or other Violence. Whereas, on the contrary, the Neck of this Bone is found to be very small, infirm, and brittle: So that it will be much easier for the Neck thereof to be broken, than its large Head to be forced out of its Socket. The Reason why this Fracture has been so commonly taken for, and treated as a Luxation, seems to be owing to the close Concealment of this Part by so many thick Muscles; and on that Account the *Trochanter Major* has been frequently mistaken for the Head of the Thigh-bone.

A Luxation of the Thigh-bone usually happens from an internal Cause.

X. From what has been said, we may perceive the Reason why the antient Surgeons had generally such bad Success in reducing this their supposed Luxation, scarce ever making a Cure without laming the Patient: To say nothing

of the Torture and bad Conſequences of their improper Extenſions by Machines. They thought their not being able to reduce theſe Luxations, was, becauſe they could not make an Extenſion ſtrong enough to overcome the robuſt Muſcles of this Part: Upon which Account, they invented all Sorts of Pullies and ſtrong drawing Machines, whereby they might extend and draw with the greateſt Force: Figures of which may be ſeen in SCULTETUS's *Armamentarium.* But as the Bone was not diſlocated, but fractured, all the good they did the Patient was little elſe than exciting violent Pain, Convulſion, Inflammation, Abſceſs, and other grievous Symptoms. For nothing is more certain than that a true Luxation of this Bone from external Violence, was ſcarce ever at the Bottom of any of their Caſes, which they, as ſome now do, ſuſpected to be ſuch: For it is ſcarce poſſible the Head of this Bone ſhould ſlip out of its Socket; unleſs ſome great Weakneſs or Relaxation of its Ligaments, and a Congeſtion of morbid Humours between the Joint has happened ſome Time before, by which Means this otherwiſe very ſtrong Ligament may, by degrees, be ſo elongated and relaxed, as eaſily to give way to ſome future external Force, which is obſerved to happen in Children rather than Adults. In theſe young Patients the Head of the Thigh-bone generally falls inwards toward the great Aperture of the *Os Pubis*, and can ſeldom be replaced: It moſt commonly adheres to that Bone; and the Children who labour under this Complaint, if properly ſupported by ſtrengthening Medicines, are yet able to walk, though not without limping.

Luxation of the *Patella* and Knee.

XI. A Diſlocation of the Knee-pan is ſeldom diſcoverable by an unſkilful Surgeon, eſpecially when the Motion of the Bone, from its natural Seat, is very eaſy and large. For if he be deſtitute of anatomical Skill in the Joint, there is great Danger of his treating it for a Diſlocation of the Knee, tormenting the Patient with Pain from an uſeleſs Extenſion. But ſuch as have before duly conſidered the natural Diſpoſition of theſe Bones, will readily perceive whether the Diſlocation be of the *Patella*, or of the Knee: For the Knee-pan is always puſhed either without or within-ſide the Joint. But for the Knee itſelf, though the Head of the *Tibia* may be forced on either Side that of the Thigh-bone; yet, as the Articulation is very broad and grooved, being defended and held faſt by exceeding ſtrong Ligaments, it never happens to be perfectly luxated.

Luxation of the Foot.

XII. The Foot, indeed, is not exempt from being puſhed out before or behind from the *Sinus* of the *Tibia*: But it cannot be diſlocated on either Side, becauſe prevented by the two Heads of the Bones which form the Ankle, unleſs they ſhould chance to be broke at the ſame Time. The lower Head of the *Tibia* may be ſometimes ſeparated by a great Force from that of the *Fibula*, and the Foot may at the ſame Time be diſlocated outwards, as we read in ſome Obſervations. CELSUS has treated of this Species of Luxation, *Book* VIII. *Cap.* 11. The Bones of the *Tarſus* are connected to each other by very ſtrong Ligaments, and ſo cannot be eaſily diſlocated: But they are ſometimes ſo violently ſtrained, as to occaſion moſt ſharp Pain, Convulſion, and *Sphacelus*, unleſs prevented by timely Aſſiſtance. Laſtly, the Toes are ſeldom luxated; but if they ſhould, they muſt be treated like the Fingers.

The Cauſes of Luxations.

XIII. The *Cauſes* of Luxations are either external or internal. The *external* are Falls, Blows, Leaps, Strugglings, and ſuch like. The *internal* are preternatural Congeſtions in the Articulations: As when morbid Humours gather and

relax the Ligaments, ſo as to make the Joint diſlocate of itſelf, or by a Force not much greater, as riſing up, walking, leaping, *&c.* a ſad Inſtance whereof, I ſaw in a Student at *Altorf*. And another Inſtance of the ſame Kind I remember in the Manager of a conſiderable Farm, who frequently diſlocated his Shoulder-bone from a very ſlight Motion of his Arm. The weaker Men are, the more ſubject to this Sort of Luxation. Hence it is that the Bones in the Limbs of Infants are ſo eaſily diſtorted, and wholly ſeparated from their *Epiphyſes*, upon a Fall, or rough handling. It is alſo worth obſerving, that ZWINGER (*Theat. Pract.* II. *pag.* 109.) knew a lame Woman that bore three lame Sons.

The Signs of Luxations.

XIV. Many and various are the Signs of Luxations of the Bones: As from (1.) The want of Motion in the Joint. (2.) The Change of Figure or natural Poſture of the Limb. (3.) An unuſual Hollowneſs or Protuberance, there being always a Tumor on that Side where the Bone is out, and a Cavity on the other where it came from. (4.) From the Difference of Length in the Limb, which is uſually ſhorter when the Bone is diſlocated upwards, and longer, when downwards; or laſtly, (5.) from the Pains excited by the violent Diſtortion of the Ligaments. For unleſs the Diſlocation be ſpeedily and rightly reduced, it is ſcarce poſſible but there muſt follow violent Convulſions, Inflammations, *Sphacelus*, and Death itſelf, merely from the vehement Diſtention of the Ligaments. But when the Bone is gradually thruſt out of its Place from internal Cauſes, then there is ſcarce any Uneaſineſs perceived. In the mean time, to make a more ready Diſcovery of Diſlocations in general, it may be very proper to have in Readineſs an univerſal Rule; *viz. That whenever the Head of any Bone is removed out of its Place, its other End will be diſtorted in an oppoſite Direction*: When the upper End of a Bone is thruſt inward, its lower one will ſtand outwards, and when the firſt is outwards, the latter will be bent inwards.

The Signs proper to particular Luxations.

XV. Tho' theſe common Signs of Luxations, with a Knowledge in the Mode of each Articulation, may be generally ſufficient to diſcover moſt Diſlocations: (as, for Inſtance, where there is a Luxation, you will feel a Cavity and a *Sinus* by preſſing your Finger upon the Place; and, unleſs it be ſoon reduced, a Swelling and Inflammation will enſue) Yet we ought not to be ignorant of ſeveral other Signs which are proper to ſome Luxations only. Thus in a Diſlocation of the lower Jaw, the Mouth gapes open and cannot be ſhut by the Patient. When one *Vertebra* is puſhed over another, all the Parts beneath it are deprived of Senſe and Motion: For none of the *Vertebræ* can be diſlocated in any manner, without compreſſing or wounding the *Medulla*, which is tranſmitted through their Middle, in Conſequence of which, the Courſe of the Spirits through it and its Nerves to the lower Parts, will be either diſturbed or wholly intercepted. When one of the Ribs is diſlocated, the Breath is very difficult to be drawn, and other bad Symptoms of the like Kind ariſe. But to open at large the peculiar Signs of every other Luxation, is not the Buſineſs of this Place: Eſpecially as they may be readily deduced from the Action of each particular Part where they happen.

Signs of imperfect Luxations.

XVI. A Subluxation or Strain may be diſcovered, when the Patient has ſuffered under ſome great external Violence, and the particular Joint is afflicted with Immobility and violent Pains, the natural Figure or Poſition of the ſame being little or nothing changed. But however, upon a more ſtrict Examination

tion of the Part affected, there may be almoſt always found ſome little Inequality in the Articulation or Limb.

XVII. Laſtly, Luxations which proceed from internal Cauſes may be known from the following evident Signs: (1.) The Limb is ſo much relaxed as to be eaſily turned about in any Direction. (2.) There will be a Cavity about the Place of the Articulation, and the Fingers will perceive a Hollowneſs upon preſſing them between the Bones, and a preternatural Swelling will appear in another Place. (3.) The Bone that has ſlipped out may be eaſily replaced, but then it ſoon falls out again of itſelf; ſo great is the Weakneſs of the Ligaments and Muſcles, that they are not able to keep the Bone in its right Place. Hence, (4.) the diſlocated Limb will be longer than the ſound one. It is alſo (5.) generally not accompanied with any Pain, Inflammation, or Convulſion, as is uſual in other Luxations. Laſtly, (6.) from the Seat of this Luxation, being generally in the upper Joint of the Thigh or Arm, and ſometimes in the Articulation of the Foot with the *Tibia*. Signs of Luxations from internal Cauſes.

XVIII. If any Surgeon deſires to be well ſkilled in the *Diagnoſis* and *Prognoſis* of Luxations, I adviſe him to be well verſed in the Structure and Difference of the Parts affected, as well as to compare the Caſe carefully with the ſeveral Cauſes and other Circumſtances of Luxations. For thus we find that *imperfect* and *ſimple* Luxations are reduced with much more Eaſe, and treated with much greater Succeſs, than ſuch as are attended with Wounds, Fractures, Convulſions, Inflammations, or the like. The Reduction is not only more difficult in Proportion to the Number of Accidents or Symptoms, but alſo as the Bones are more or leſs diſtant and ſeparated from each other: Inſomuch, that the Bones cannot often be replaced, by reaſon of the Fracture and great Inflammation; or, if they are once reduced, it is very difficult to retain them in their Places, and perfect the Cure without Lameneſs, from the great Weakneſs of the Ligaments: Which laſt is uſually the more certain in Luxations from internal Cauſes. But in Luxations that happen from internal Cauſes in very young Subjects, the lower Part of the Limb generally waſtes, and becomes altogether weak and flaccid. Luxations that have juſt happened, are in the general much eaſier and ſooner cured than thoſe of long ſtanding: For in the latter there generally ariſes a Tumor with Inflammation, and the Juices gather in great Quantity, by which Means the Ligaments are extremely relaxed, or the Articulation ſo glewed up and obſtructed, that it cannot receive the Head of the Bone as before. Nor is it unuſual for the Head of the diſlocated Bone, in an inveterate Luxation, to lodge itſelf in ſome new *Sinus*, on one Side its natural one; by which Means the Head of the Thigh-bone has adhered and grown to the external Part of thoſe of the Hips, or elſe to its *Acetabulum*; that Cavity itſelf being filled up with ſome preternatural and tenacious Juice. It may be obſerved in general, that Luxations are very ſeldom mortal, except in the Head, and in the *Vertebræ*. The *Prognoſis* of Luxations.

XIX. If any Bone be diſlocated in Infants, or ſeparated from ſome *Epiphyſis*, the Caſe is very dangerous, and uſually attended with very bad Conſequences. For (1.) the Head of the very ſoft and cartilaginous Bone is ſo diſtorted as to be ſeldom if ever reducible to its natural Figure. (2.) Theſe Kinds of Luxations are uſually concealed by Maids and Nurſes, ſo that they do not come under the Care of the Parents or Surgeon, till it is too late. (3.) The Caſe of Infants Luxations in Infants.

rarely admits of a regular Extenſion and Reduction of the Part, from the Extremity of Pain, which they are incapable of bearing. (4.) When the Luxation in younger Patients has been of any ſtanding, the Head of the Bone is ſo enlarged, and the *Sinus* or Socket ſo contracted, that it is often impoſſible to render it. (5.) It may happen that the Surgeon, ignorant of the true Cauſe, will take it to be and treat it as proceeding from a Flux or Humors, often too violently extending thoſe ſoft and now cartilaginous Parts, and throwing them into ſome very bad Poſture. Laſtly, (6.) want of Skill in the Surgeon may be an Occaſion of the Bones not being happily replaced in Infants: For nothing is more improper than the violent Diſtenſion ſome Surgeons uſe in theſe Caſes, whereby they ſeparate thoſe ſoft Bones and their *Epiphyſes* more from each other, and occaſion many bad Symptoms.

If attended with a Wound.

XX. Diſlocations attended with a Wound, eſpecially of the Shoulder or Thigh-bone, are of very bad Conſequence, and often endanger the Life of the Patient; in CELSUS's *Opinion*, *Book* VIII. *Chap.* 25. whether the Bones be replaced or not, there is generally great Danger; and ſo much the more, the nearer the Wound is to the Joint. HIPPOCRATES has declared that no Bones can be reduced with Security, beſide thoſe of the Hands and Feet. *Vectiar.* 19. 5.—See more on this Subject, in that Paſſage of CELSUS juſt now quoted: Though I by no Means recommend the following him implicitly.

CHAP. II.

Concerning the CURE *of* LUXATED BONES.

The Cure of Luxations.

I. THE Method of treating Luxations of the Bones does pretty much agree with, and is in a great Meaſure the ſame with, that uſed in Fractures. For in Diſlocations, as in Fractures, the whole Deſign of the Surgeon is, (1.) To reſtore the luxated Bone to its Place, firſt by Extenſion, and then by Reduction with his Hands. (2.) to preſerve and retain what is ſo replaced in their natural Poſition. And laſtly, (3.) To prevent and cure the ſeveral Symptoms which uſually attend. The Reduction is uſed to be commodiouſly performed by placing the Patient on a Stool, Table, Bed, or the Ground, as the Surgeon ſhall think moſt ſuitable to the Caſe. It is however to be obſerved here, that thoſe Luxations are moſt readily reduced on a Stool, which happen in the Jaw, Clavicle, Arm, or Hand: On a Table, ſuch as happen in the *Vertebræ* or Thighs: On a Bed, ſuch as happen in the Legs or Feet: And laſtly, thoſe Diſlocations are moſt commodiouſly reduced on the Floor which happen on the Shoulders or *Vertebræ* of the Neck.

Of (1.) the Extenſion.

II. The Extenſion, as we obſerved, in diſlocated Bones, is to be made much after the ſame Manner as in Fractures: *viz.* the outer or lower Part of the diſlocated Limb is to be extended by an Aſſiſtant, till the Head of the diſordered Bone be found to correſpond exactly with the *Sinus* from whence it was luxated. This may be done by the Hands, but if they are not ſo convenient, the Extenſion ſeldom fails of being made ſo well by a Napkin, as to render the Machinery delineated in ſuch an ample Manner by ORIBASIUS, PAREY, ANDREAS A CRUCE,

CRUCE, SCULTETUS, and others, generally unneceſſary: Since they can effect ſcarce any thing more, unleſs it be to terrify and diſcourage the Patient in the Extenſion, by their formidable Shew.

III. To replace the luxated Bone again in its natural Seat, the Surgeon muſt regulate the Aſſiſtant's Extenſion, by ordering it to be ſtrong enough, and in a right Direction; in the mean Time he is to compreſs the Articulation gently with his Hands and Fingers, till he find the elapſed Bone recover its right Place. Of (2.) the Reduction.

IV. An accurate Reduction of a Luxation is known to have been effected by the ſame Signs which have been beforementioned in the Doctrine of Fractures. It is a good Sign (1.) if the Bone be heard to ſnap or crack in its Reduction. (2.) When the diſordered Limb is found to be of the ſame Length with the ſound one. (3.) When the Pains grow leſs. Or laſtly, (4.) when the Limb can perform its uſual Motion. How to know when the Bones are rightly replaced.

V. But as Fractures are often prevented from being directly ſet by being attended with Inflammation, Hæmorrhage, or Tumor; ſo alſo Luxations often cannot be ſafely reduced before thoſe impeding Symptoms are firſt removed, or at leaſt much abated, by a proper Treatment. (See *Book* II. *Chap.* II. § XI.) In ſuch Caſes alſo where the Luxation is accompanied with a Fracture, the Reduction muſt be put off till that is firſt ſet and joined: For the Extenſion cannot be ſafely attempted till the Fracture be well joined by a firm *Callus*. The Reduction is often to be delayed.

VI. After the Bones have been puſhed into their Places from whence they were forced out, the next Buſineſs is carefully to retain them there. But Bones that are intire are much eaſier retained than thoſe that have been broken: For the latter cannot be contained in their right Poſture without ſtrict Bandage and Reſt; whereas there is in the firſt Caſe ſeldom much Occaſion for Bandage, or any great Reſt. For thus in freſh Diſlocations of the Jaw, Bones of the Fingers, Hands, *Cubitus*, and *Humerus*, the Bone may be immediately reduced without further Bandage or Reſt; becauſe they are generally held firm enough by their proper Ligaments and Muſcles. It ſeems rather more neceſſary to bend, extend, and gently move the Limb ſometimes, than to endanger its becoming ſtiff and immoveable by a long Inactivity. But when the Luxation happens in the lower Extremities, it ſeems better to let the Patient reſt a few Days in his Bed, moving the Limb gently as ſoon as he finds it capable, and afterwards he may riſe and walk cautiouſly with it. How the luxated Limb is to be treated after Reduction.

VII. On the other hand, when the Ligaments have been much ſtretched by a violent and long continued Diſtenſion, or have been rendered infirm by any other means, it ſeems altogether neceſſary to make uſe of ſome proper Bandage, and to recommend Reſt to the Patient, till the Ligaments have regained their former Strength. But here it muſt be alſo carefully obſerved, to let the diſordered Articulation ſometimes have a little gentle Motion, by an eaſy Flexion and Extenſion of the Limb, to prevent any Stiffneſs or other bad Conſequence from ſuch a continued Reſt. In the mean Time, it may not be improper to moiſten the Bandages and bathe the Part well with *Sp. Vin. Aq. Hungar.* or ſome other warm and ſtrengthening Spirit, by which Means the Ligaments are uſed to become very firm and ſtrong. The Bandages themſelves ſhould be neither too tight nor too looſe: The Reaſon for which, we have given in *Book* II. *Chap.* Of an inveterate Luxation.

Chap. I. § XXXIV. treating on Fractures. As for the Application of Plaſters, which has been ſuch a prevailing Cuſtom in theſe Caſes, they may be altogether omitted here, as in Fractures, without any Danger: They ſeem even to do more Service by their Abſence than Preſence.

Of the Symptoms of Luxations.

VIII. The Inflammations, Tumors, Pains, Convulſions, Hæmorrhages, and other ſuch Symptoms which happen before or after the Reduction of a Luxation, are to be treated and cured in the ſame Method with that we preſcribed before in the Cure of Wounds and Fractures, *Book* I. *Chap.* II. § XVII, XVIII. *Book* II. *Chap.* II. § I. But as ſoon as the Bones are replaced, the forementioned Symptons generally vaniſh, by Degrees, of themſelves. When the Ligaments are very much weakened, it is extremely uſeful to bathe the Part, after it has been firſt well rubbed with hot Linen Cloths, with highly rectified Spirit of Wine ſet on Fire, uſing plentifully afterwards ſome ſtrengthening Spirit, (as at *Book* II. *Chap.* II. § IX.) and then binding it up with a proper Bandage. But if violent Pains ſhould remain, notwithſtanding the Luxation be reduced, there is Reaſon to fear that there is a Fracture along with it. We muſt therefore endeavour to be ſatisfied with regard to this Certainty; and if we find a Fracture, we muſt uſe our Endeavours to ſet it. But if you find no Fracture, you muſt perſevere in applying ſtrengthening Fomentations and highly rectified Spirits; for after conſiderable Diſlocations, (eſpecially in the Knee or Foot, which bear the Streſs of the Body) if they are not immediately reduced, the Pains often prove obſtinate, are of long Continuance, and require great Patience. If a ſlight Fever ſhould attend, Bleeding, a thin Diet, and cooling Medicines are to be uſed. If a Gangrene ſhould appear, which may ſometimes happen, it muſt be treated not only with the Medicines which we have before recommended, but alſo with Fomentations and digeſtive Cataplaſms, binding up with the eighteen-headed Bandage. For the reſt of the Symptoms, they may be treated as we propoſed, *Book* II. *Chap.* II, always taking Care to let the Diſlocation be reduced firſt. If a Luxation ſhould be attended with a Wound, we muſt make uſe of the eighteen-headed Bandage, and proceed with the reſt as we have directed in Hæmorrhages, *Book* II. *Chap.* II. in the Doctrine of Wounds. If in Diſlocations attended with a Wound, an Hæmorrhage enſue, you muſt proceed at the firſt Dreſſing in the Method above deſcribed, where we treated of Wounds, *Book* I. *Chap.* II. and the Wound muſt be healed with balſamic Medicines. If an Abſceſs ſhould be formed, it will be much the beſt to open it as ſoon as ever we find it to be ripe: For elſe there will be Danger leſt by the long ſtay of Matter, it ſhould corrode the Articulation and Bones, and produce the worſt Kind of *Fiſtulæ*, which are often to be remedied by no Means, but that of amputating the Limb. When the Bones are diſlocated with ſo much Violence as to break and deſtroy the Ligaments, Tendons, and adjacent Skin; the Caſe is then, as HIPPOCRATES has obſerved, altogether incurable. For the more we ſtrive to replace them, the leſs Inclination have they to join again firmly; and by exciting Convulſions and a Gangrene, take off the Patient. Therefore whenever Luxations are attended with ſuch grievous Accidents as are certainly deſperate, if we would preſerve the Life of the Patient, we muſt of Neceſſity ſpeedily take the Member intirely off. If the Luxation is attended with a Fracture, then the Luxation muſt be reduced firſt, if poſſible,

and

and the Fracture is to be set afterwards. But when this cannot be done, it will be proper to have Recourse to what we have before observed on Fractures, *Book* II. *Chap.* II. § XI. If any Joint should become stiff and immoveable, it will be proper to treat it in the Manner mentioned near the Place now cited. Lastly, if the Luxation be inveterate, and the dislocated Bone, after the Use of Baths and emollient Fomentations cannot yet be reduced, it is much better to abstain from violent Extensions, and give it up, than to torture the Patient with excessive Pains which might probably excite the most grievous Symptoms.

CHAP. III.

Of Luxations *in particular; and on those of the* Head *and* Nose.

I. HAVING treated of Luxations in general, it remains that we consider each particular Luxation by itself. We shall therefore begin first, with those of the Head, and then descend to the rest, as we did in expounding the Doctrine of Fractures. There are not wanting some who deem it a Luxation of the Head, when the Bones of the *Cranium* are separated any Distance from each other; whether it proceeds from an *Hydrocephalus* in Infants, or from violent Head-achs, or ardent Fevers in Adults. But there is no room for us here to treat more largely on these Luxations. The Method of treating the first, we shall deliver when we come to consider the *Hydrocephalus*. But as the other very seldom, if ever, happens, it seems to be curable by no other Method than that of Bandage and Compression. Dislocation of the Head.

II. It sometimes, though not often, happens, that the Bones of the Nose are separated from each other, or distorted out of their natural Places by some violent Blow or Fall. When such an Accident happens, it is several Ways discoverable: As (1.) by the Sight, when we behold the deformed Position of the Nose. Or (2.) by Feeling. Or lastly, (3.) by the Ear, when we perceive with what Difficulty the Patient draws his Breath through his Nostrils. But as we before observed, these Luxations do but seldom happen: For the Bones of the Nose are so firmly connected to the *Os Frontis* and other Bones, that they will sooner break than separate from each other. Luxation of the Nose.

III. When this Case happens, the Patient is to be speedily placed in a high Chair, that an Assistant may stand behind and hold his Head firm, in a proper Posture. The Surgeon is then to introduce with one Hand, a thick Probe, a Goose-quill, (as in the Case of a Fracture, *Book* I. *Chap.* III.) or little Stick shaped for the Purpose, up the Nostril internally, by which means the depressed Parts of the Nose may be thrust into their Places. In the mean Time he applies his other Hand externally, to guide and direct the Parts which are moved from within. This being done, there is scarce any thing else required but to let a bit of sticking Plaster lie upon the Nose at the same Time. But if any thing should occasion a Wound in the Nose at the same Time, the Cure must be carried on in the Way which we proposed before under a Fracture of the Nose. Cure of a luxated Nose.

IV. If

IV. If a Tooth be removed from its Place by a Fracture of the Jaw, or any other Accident, it may be properly termed a Luxation. But this, when replaced, from the Teſtimony of many Writers, generally ſettles again in its Socket, and adheres firmly to the Gums.

CHAP. IV.

Of a DISLOCATION *of the* LOWER JAW.

How the Jaw may be luxated.

I. THE Lower Jaw is indeed ſeldom luxated, becauſe it is held ſo firm by ſtrong Ligaments and Muſcles, by whoſe Aſſiſtance it is retained in two *Sinuſes* in the Baſis of the *Cranium*. But when it is by Accident forced out from thence, it may chance to be on one Side only, or elſe on both, it being then thruſt directly forwards. And this happens moſt frequently from opening the Mouth too wide in yawning: Though it has ſometimes been occaſioned by a violent Blow or Fall. If it be luxated on both Sides, the Chin will incline downward, and the Jaw will be thruſt very forward: But if only on one Side, the Chin will be inclined toward the oppoſite Side; the elapſed little Head of the Jaw not being capable of Diſlocation but forward and inward[a]; for the Proceſſes of the Bones of the *Cranium* prevent the Jaw from being diſlocated backwards. Hence it ſeems ſtrange that any one ſhould aſſert, contrary to the common Obſervations and Writings of the beſt Practitioners, that the Lower Jaw may be luxated backwards as well as forwards. This is ſo inconſiſtent, that though he ſhould confirm his Opinion by Examples and Obſervations, it muſt be looked upon as the Conſequence of ſome Difference in the Articulation from what is uſual in Nature.

How to diſcover a Luxation of the Lower Jaw.

II. The Lower Jaw is chiefly known to be luxated on one Side, when the Chin is diſtorted on the oppoſite Side. For that Part to which the Chin inclines, is the ſound: But that from whence it recedes, is the luxated one. The Mouth in this Caſe gapes wider than uſual, ſo that the Patient cannot ſhut it, nor eat with his Teeth; the lower Range of Teeth being projected beyond, and on one Side the Upper. But when the Jaw is luxated on both Sides, then the Mouth not only gapes wide and open, but the Chin alſo hangs down, and is thrown directly forwards: So that it is no wonder if the Patient cannot ſhut his Mouth, ſpeak diſtinctly, or even ſwallow any thing without much Difficulty.

Prognoſis.

III. When the Jaw is out only on one Side, and the Caſe recent, the Cure is uſually not ſo very difficult. But when both Heads are diſlocated, and not preſently reſtored to their Places, it always occaſions the worſt of Symptoms, as Pains, Inflammations, Convulſions, Fevers, Vomitings, and at length, as HIPPOCRATES obſerves, Death itſelf comes on. And theſe Symptoms are the more violent, as the adjacent Nerves, Tendons, and Ligaments ſuffer a greater Extenſion. But if an expert Surgeon comes in Time, the Luxation is not very difficult to reduce.

Cure.

IV. When this Kind of Luxation happens, the Patient is to be directly ſeated on a low Stool, ſo that an Aſſiſtant may hold his Head firm back againſt his Breaſt. Then the Surgeon is to thruſt his two Thumbs as far back into the Patient's Mouth as he well can: But they are to be firſt wrapped round in a Handker-

[a] See MONRO's learned Diſſertation on this Subject. *Act. Edinb.* Vol I. Art. II.

chief,

chief, to prevent them from ſlipping or being hurt; and his other Fingers are to be applied to the Jaw externally. When he has got firm hold of the Jaw, it is to be ſtrongly preſſed, firſt downwards, then backwards, and laſtly upwards, but ſo as that they may be all done in one Inſtant: By which means the elapſed Heads of the Jaw may be very eaſily ſhoved into their former Cavities. But the Surgeon ought to be always careful to ſnatch his Thumbs quickly out of the Patient's Mouth, leſt they ſhould be compreſſed, bruiſed, or bit, by reducing the Jaw into its Place.

V. If the Jaw be out on one Side only, every thing muſt be done in the ſame Manner: But the luxated Side of the Jaw muſt be forced more ſtrongly downward and backward than the ſound one. Some ſay this Luxation may be ſometimes very readily reduced by a violent Stroke on the oppoſite Side of the Jaw: But this is a Method too pleaſant to be uſed with Safety in moſt Patients. As for Bandages there ſeems to be no great Occaſion for them in this Caſe, unleſs the Luxation has remained ſome time before it was reduced; for then it may not be improper to apply for ſeveral Days the four-headed Bandage, with ſome ſtrengthening Spirit, which may be taken off when the Patient intends to eat. Of the Jaw luxated on one Side.

CHAP. V.

Of Luxations *of the* Head *and* Spine.

I. THE Luxations which happen in the *Spine* and *Vertebræ* of the Back are generally imperfect Ones. For it appears from an accurate Conſideration of the Structure and Articulation of theſe Bones, that none of the *Vertebræ* can be entirely diſplaced without being fractured, and alſo compreſſing or wounding the Spinal Marrow, which muſt produce Danger of inſtant Death. Even the imperfect Luxations of theſe Bones are very dangerous: Which happen either between the two ſuperior *Vertebræ* of the Neck and the Head, or elſe between the reſt of the *Vertebræ*, when they are forced from each other. How the *Vertebræ* may be luxated.

II. Such as have a Luxation between the Head and upper *Vertebra*, ſeldom eſcape being carried off by a ſpeedy and ſudden Death. For in this Caſe the tender *Medulla* which joins immediately with the Brain, and is lodged in the Spine, the Brain itſelf, and the Nerves which ariſe beneath the *Occiput*, are too much diſtended, compreſſed, or lacerated. The two condyloide Proceſſes of the *Occiput* uſually ſlip out of their glenoide Sinus's in the firſt *Vertebra* of the Neck, when a Perſon falls headlong from a high Place, from off a Ladder, from on Horſeback, or when he receives a violent Blow upon his Neck. They dying very ſuddenly in this Caſe, are vulgarly ſaid to have *broke their Neck*, tho' there is generally no more than a Luxation: Yet it ſometimes happens that the *Vertebræ* of the Neck are really fractured. If Life ſhould remain after ſuch a Luxation, which very rarely happens, the Patient's Head is commonly diſtorted with his Chin cloſe down to his Breaſt, ſo that he can neither ſwallow any thing, nor ſpeak, nor even move any Part that is below his Neck. Therefore, if ſpeedy Aſſiſtance be not had, Death enſues, from the Compreſſure or Hurt of the *Medulla*. Luxation of the Head.

How the Head is to be placed.

III. But to repulse this unwelcome Messenger, the Patient is to be immediately laid flat upon the Ground or Floor. Then the Surgeon kneeling down with his Knees against the Patient's Shoulders, is to bring them together so as to contain the Patient's Neck between them: This done, he quickly lays hold of the Patient's Head with both his Hands, and strongly pulling or extending it, he gently moves it from one Side to the other; till he finds, by a Noise, the natural Posture of the Neck, and the Remission of the Symptoms, that the Dislocation is properly reduced. By this Method the Surgeon retains the Patient firm between his Knees, and performs the Extension and Reduction with his Hands.

Another Method of Reduction.

IV. The same may be effected by another Method much like the former: As when the Patient sits upon the Ground, his Shoulders being pressed down, and his Head laid hold of under the Ears, and pulled strongly, but cautiously upwards, inclining it a little to each Side, till the Signs enumerated before (at § III.) demonstrate it to be restored to its natural Place. If any of the other *Vertebræ* of the Neck should be dislocated, the Reduction is to be made in the same manner: Therefore there is no occasion to give them here a separate Treatment.

PETIT's Method of Reduction.

V. But M. PETIT *(Lib. de Morb. Oss.)* rejecting the former Methods, has taught us another Way of restoring a Luxation of the Head, though he does not mention that he ever used it. He forms two Slings, having a large Opening about their Middle, as is delineated in *Tab.* X. *Fig.* 1, 2. The Patient lying on his Back, he takes the Sling, *Fig.* 1. and puts his Head through the Opening AB, which is made purposely large enough, and proportionable to the Size of the Head: The Part of the Sling A comes under the Patient's Chin, the Part B is placed under the *Occiput*, and the two Extremities of the Loop CC, come up over his Ears, the Ends D and E being the Parts by which the Extension is made. But to hold the Patient firm, he recommends another Sling, *Fig.* 2. through whose Opening F, the Head is transmitted so as to make the Part of the Sling G come down his Back, and the Part H to come over his Breast, the two Extremities of the Sling II, are to be joined together between the Thighs, and by this means the Body is to be held from giving Way to the Extension made by the other. While the Head and *Vertebræ* of the Neck are kept sufficiently extended by pulling these Slings in opposite Directions, the Surgeon endeavours to replace the luxated Bones. But, to say Truth, the preceding Methods seem to me to have the Preference: Partly because they are more simple and performed without any Assistants or other Instruments than the Hands, which former are not always to be had; and partly because the Patient may be relieved much sooner by these Means; for while the Machinery is fetching or adapting, the Patient will, in all Probability, be dead. PETIT lays down no other Method of reducing this Luxation, throughout his whole Book, than by his Slings, not even how to assist the Patient in such Cases: Whereas the Accident may happen very often in the Country, where such Slings and Assistants cannot be had to help the Patient. In the mean time, a Napkin, or long Slip of Linen of two or three Hands breadth, slit to let the Patient's Head through, will make a good Substitute for these Slings when they are not at hand.

What is to be further done.

VI. But after any of the *Vertebræ* are replaced by any Method, it will be proper, in order to prevent a Tumor, and restore the stretched Ligaments of the

the Neck to their former Vigour, to bathe it with *Aq. Hungar. Sp. Vin. Camph.* or some other strengthening Spirit applied warm, as also Compresses dipped in the same: The Patient should bleed, and rest gently for some Days, till the Neck be found sufficiently strong and well. As for Bandages, there seems to be little occasion for them here, unless it be such as are designed to keep on the Compresses, dipped in some strengthening Spirit.

Of Luxations in the other *Vertebræ* of the Back.

VII. With respect to the rest of the *Vertebræ* of the Back, they are seldom moved quite out of their Places, unless they are fractured, they being retained for the greatest Part, by adhering to the adjacent Ligaments and Muscles. Therefore the Luxations which happen among them are usually imperfect; no more being displaced than their two upper or lower Processes, and they often but on one Side. And this happens sometimes to one of the Spinal *Vertebræ*, and sometimes to more. But it is here to be briefly observed, that it is usual to include among the Number of luxated *Vertebræ*, that which is sound and firm, but intercepted by others which are not so. Thus whenever the upper *Vertebra* of the Loins from the last of the Back, and lowermost *Vertebra* of the Loins next the *Os Sacrum* are luxated, we commonly say and reckon there are five *Vertebræ* out of their Places: When strictly speaking, only the two outermost or the uppermost and lowermost of those *Vertebræ* are disturbed; the three middle Ones retaining their natural Situation and Connection.

How Luxations of the Spinal *Vertebræ* can happen.

VIII. If any one closely considers the natural Structure and Connection of these Bones, it will pretty evidently appear, that the Spinal *Vertebræ* are not to be luxated but by some very considerable Violence. For, besides their being most closely joined to each other by means of *Processes* or *Apophyses*, they are tied together and connected very firmly by exceeding strong Ligaments and Cartilages. And this is the Reason why the Spinal *Vertebræ* are not luxated, unless those Cartilages and Ligaments should break, in violently bending the Back, or receiving some great Blow or Fall thereon: For these Accidents are generally so far from separating them, that they drive them more closely together. But if this should happen from some very great Violence, it shatters the Spinal *Vertebræ* and their *Medulla*, and quickly kills the Patient, as I myself have sometimes seen. Therefore whenever a *Vertebra* is luxated without being fractured, the Body must, of Necessity, incline strongly forwards, or on one Side. For in this Case, the superior Processes of the *Vertebræ*, by which they are fastened to each other, will be separated from the inferior Processes, by which means the *Vertebræ* will be disposed to be easily removed from each other: And they will incline towards the right Side, when the Hurt is on the Left, and the contrary.

The common Signs of Luxations in the *Vertebræ*.

IX. The Signs common to Luxations in the *Spina Dorsi* are chiefly the following: The Back itself is found to be crooked or unequal, after the external Violence has been inflicted: The Patient can neither stand nor walk, and his whole Body seems to be paralytic. The Parts which are beneath the luxated *Vertebra* are nearly without all Sense and Motion: The Excrements and Urine cannot be discharged, or else they are sometimes emitted involuntarily; the lower Extremities grow dead by Degrees; and, at length, Death itself follows. But these Symptoms vary in Proportion to the Degree of Violence in the Luxation: For the more Disorder the *Spina Dorsi* undergoes, the more grievous and dangerous will be the consequent Symptoms.

The particular or proper Signs.

X. But what Number of the Spinal *Vertebræ* are luxated, muſt be judged of by the Degree of that preternatural Incurvation[a]. For where there is but one *Vertebra* luxated, the Curvature is gibbous, making a Sort of Angle. If the Proceſſes of the *Vertebræ* are diſplaced forwards, then the *Spina Dorſi* will ſeem to bend inwards; and the Patient will always have violent Pains upon bending his Body: On the contrary, when he lies upon his Back, the Pains will be more gentle. If the *Vertebra* is luxated on the right Side, the Body may be obſerved to incline towards the Left, and it will be eaſier bent on the right than left Side: If the *Vertebra* be luxated on the left Side, the contrary of all theſe Appearances uſually follow.

Prognoſis.

XI. If any one be deſirous to preſage the dubious Events of Luxation in the *Vertebræ*, I would have him remember that theſe Caſes are generally very dangerous and uncertain: And that, even when the *Medulla* is neither contuſed nor wounded, but from the Difficulty of reducing the luxated *Vertebræ:* And the more the *Vertebræ* are diſplaced, the more will the *Medulla* be injured, the worſe will be the Symptoms that ariſe, and the more precipitate will be the Patient's End. The nearer the luxated *Vertebra* is to the Head, the greater and more extenſive is the conſequent Danger. For as Injuries are the eaſieſt to be inflicted upon the *Medulla* in thoſe Parts, ſo they are always of the worſt Conſequence. Therefore Luxations in the Neck are always more pernicious than thoſe which happen in the Back; and thoſe in the Back are much worſe than thoſe which happen in the Loins. And what may ſeem wonderful is, that the Symptoms appear much milder in Caſes where ſeveral *Vertebræ* are luxated, than they do when there is only one; and ſtill much milder, when the Proceſſes on both Sides are diſplaced, than when only one of them are luxated. For in the latter of theſe Caſes, the *Medulla* is more compreſſed upon a leſs Space, as will appear evident to ſuch as carefully conſider the Structure of the *Spina Dorſi*. But then in ſlight Luxations the *Vertebræ* may be more eaſily replaced, and therefore Men may be often in leſs Danger of Death on that Account.

Cure.

XII. To make the Caſe no better than it is, Luxations of the Spinal *Vertebræ* are, in general, very difficult to reduce. The Artifices uſed by the Ancients were ſo foreign and unadequate to the Caſe, that they ſeem to have been uſed to no Purpoſe, proving rather a Torture than a Remedy. The following ſeems to be the moſt ſuitable Method of reducing Luxations of the *Vertebræ:* When the *Apophyſes* of the *Vertebræ* are diſlocated on both Sides, the Patient is to be laid leaning upon his Belly over a Caſk, Drum, or ſome other gibbous Body. Then two Aſſiſtants are ſtrongly to preſs down both the Ends of the luxated Spine, on each Side: By which means the Bone of the Spine will be ſet free from each other, lifted or puſhed up in the Form of an Arch, and ſo gradually extended. This done, the Surgeon preſſes down the luxated *Vertebræ*, and at the ſame time nimbly puſhes the ſuperior Part of the Body upwards: And by this Means the luxated *Vertebræ* are ſometimes commodiouſly reduced into their right Places. But if Succeſs ſhould not attend the firſt Time, the Method ſhould be repeated two or three Times more.

XIII. PETIT lays a thick Cloth rolled up like a Cylinder acroſs upon the Bed, and placing the Patient over it, treats him in the ſame Method which we juſt now propoſed. When the *Vertebra* comes out on one Side, the Patient is then

[a] See SAVIARD's *Obſ.* of Luxations of the *Vertebræ Dorſi.*

to

to be placed inclining in the prone Posture now mentioned; but so that, when the left *Apophysis* is displaced, one Assistant may press the lower *Vertebræ* inwards to the Right, and another Assistant may depress the right *Humerus*, & *vice versa*. For if there be any convenient Method of reducing the Spinal *Vertebræ* when luxated, there can scarce be any more commodious than that here proposed. And from hence I see it will appear evident, thet the generality of those Slings, Bandages, Pullies, Leavers, and other Instruments, which the antient Surgeons used to fasten about the Patient's Hips, Shoulders, and Breast, and are to be seen figured and described in Oribasius, Parey, and Sculletus, must be on every hand allowed to be so far from suitable for reducing these Luxations, that they must be generally pernicious.

XIV. For the Remainder, it seems proper, after the *Vertebræ* are reduced, to bathe the Spine with *Sp. Vin.* or to lay on Compresses dipped in *Sp. Vin. Camph.* and to bind the Parts up with the *Napkin-and-Scapulary*. Afterwards the Patient is to be laid in a soft and even Bed: Bleeding, and bathing the weak Parts with strengthening Spirits, are to be used as there may be Occasion. The Bandage must be very seldom taken off, and all the Symptoms which happen in these Luxations are to be palliated as usual, till the Cure is perfected.

CHAP. VI.

Of Luxations *of the* Os Coccyx, *Ribs, and Clavicles.*

I. THE *Os Coccyx* may be thrust inwards by a violent Fall or Blow, and it is often pushed outwards in hard Birth. When this happens, it is usually attended by violent Pain and Inflammation about the lower Part of the Spine, Abscesses form in the *Intestinum Rectum*, and the *Fæces* are constipated or suppressed. To discover the Luxation of this Bone the more readily, we have Recourse to the Use of our Hands and Eyes, as well as to the Knowledge of the forementioned Symptoms. Nor is the replacing this Bone very difficult, if attempted by a careful and expert Surgeon [a]. For if it be thrust outwards, it must be depressed into its right Place by the Thumb: After which may be applied Compresses dipped in warm Wine, or its Spirit, made broad above, and narrow below, to fill up the posterior *Sinus* of the *Nates:* And these may be held on by the T Bandage of Heliodorus, *Tab.* II. *Fig.* h. But that Part of this Bandage which comes between the Thighs, should be slit and placed so that the Patient may go to Stool without undoing the Bandage, and to prevent the Bone from being by that Means displaced again. A Luxation of the *Os Coccyx* outwards.

II. When the *Os Coccyx* happens to be luxated inwards, the first Finger is to be introduced into the *Anus:* After it has had its Nail cut and been dipped in Oil, it must be thrust as far as possible, that it may the more readily drive out the depressed Bone: The other Fingers being applied externally, are to conduct the Bone into its right Posture. When this has been done, it will be proper for the Patient to rest some time upon the Bed; and when he sits up, it should be in a Luxation of the *Os Coccyx* inward.

[a] Petit acquaints us, that, from neglecting the Assistance of a Surgeon in this Case, an Abscess ensued, a Caries, a slow Fever, and which terminated in Death. See his Treatise on *Diseases of the Bones*, T. I. C. 5.

Chair

Chair with a Hole in its Bottom, leſt the affected Part ſhould be otherwiſe compreſſed or diſturbed.

Luxations of the Ribs.

III. The Ribs are indeed ſometimes, tho' but ſeldom, diſlocated. For upon the Aſſault of ſome external Violence, it is not uncommon for them to be diſplaced either upwards, downwards, inwards, or outwards. They cannot be eaſily luxated outwards, becauſe prevented by the Vertebral Proceſſes, and reſiſted by very thick and ſtrong Muſcles. But when they are drove into the Cavity of the *Thorax*, they not only lacerate the *Pleura*, or Membrane, which lines the Cavity of the *Thorax*, but do generally great Injury to the contained Parts. In conſequence whereof ariſe moſt ſharp Pains, Inflammations, Difficulty of Breathing, Cough, Ulcers, Immobility, and many other dangerous Symptoms of the like Nature. But by what Signs ſuch Diſlocations of the Ribs are to be diſcovered, there is no occaſion to conſider here at large: Since the external Form and Poſture of the Side, with the troubleſome Symptoms now enumerated, generally afford evident Demonſtration whether any of the Ribs are luxated, and on which Side.

How the Ribs are to be reduced, when luxated upward or downward.

IV. The more numerous and grievous the conſequent Symptoms are, the greater is the Danger, and the more ſpeedily ſhould the Luxation be reduced. When the Rib is diſlocated either upwards or downwards, in order to replace it conveniently, the Patient is to be laid on his Belly upon a Table, and the Surgeon muſt ſtrive to reduce the luxated Rib into its right Place with his Hands: Or, the Arm of the diſordered Side may be ſuſpended over a Gate or Ladder, as is ſhewn by Figures in PAREY and SCULTETUS, and while the Ribs are thus ſtretched up from each other, the Heads of ſuch as are luxated may be puſhed into their former Seat.

How the Ribs are to be reduced, when luxated internally.

V. But thoſe Luxations, wherein the Heads of the Ribs are forced into the *Thorax*, are generally found to be much the moſt difficult to reduce; ſince neither the Hand, nor any other Inſtrument, can be applied internally to direct the luxated Heads of the Ribs. But notwithſtanding there are many eminent Surgeons who pronounce this Caſe to be wholly incurable; yet, in my Opinion, we ought not to deſpair of being frequently ſucceſsful. In this Caſe it ſeems proper to lay the Patient on his Belly over ſome gibbous or cylindric Body, and to move the Fore-part of the Rib inwards towards the Back, ſhaking it ſometimes: For thus generally the Head of the luxated Rib ſlips into its former Place. But if this Method of Cure will avail nothing, and the deplorable Condition of the Patient requires ſpeedy Help, we have no Remedy left but Inciſion, and endeavouring to replace the luxated Head of the Rib with the Fingers, Plyers, or little Hooks, after the ſame Manner which we propoſed before in Fractures of the Ribs, *Book* I. *Chap.* X. § VIII, *& ſeq.* In the mean time, where the Symptoms are not very urgent, and the Heads of the Ribs but little diſplaced, it is adviſeable neither to cut the Fleſh, nor violently force the Ribs: Becauſe there are ſeveral Inſtances where the luxated Ribs have retained their diſlocated Stations without any Hurt. But above all, Care muſt be taken to lay on a Compreſs dipped in warm *Sp. Vin.* or *Sp. Vin. Camph.* to be retained on the afflicted Part of the Side by the *Napkin-and-Scapulary*.

Luxations of the Clavicles.

VI. Tho' the Clavicles are ſometimes diſplaced, it is but ſeldom, by reaſon of their ſtrong Ligaments. They may be diſlocated either from the Top of the *Sternum*

Sternum or *Proceſſus Acromion* of the *Scapula*, to which they are connected, by ſome external Violence, as a Fall, Blow, the lifting ſome great Weight, or the like. With regard to the Cure, the ſooner Aſſiſtance is had to the Patient, the more eaſily may the Reduction of the Clavicle be performed: But when the firſt is delayed, the latter will be more difficult, inſomuch that inveterate Luxations of the Clavicles are generally found incurable.

VII. The Clavicles may be diſlocated in two Manners from the *Sternum*, either internally towards the *Larynx*, or externally upon the Breaſt. When the firſt Caſe happens, a Cavity may be generally obſerved upon the Part affected, and the *Trachea* with the Carotid Arteries, the jugular Vein, Nerves, and *Oeſophagus*, which are all together, will be very much diſturbed and compreſſed. On the contrary, when it is luxated forwards upon the Breaſt, it ſhews itſelf by a preternatural Tumor inſtead of a Cavity, upon that Part. (1.) near the *Sternum*.

VIII. In what manner the luxated Clavicles may and ought to be extended and reduced again into their natural Places, has no Buſineſs to be inſerted again in this Place: Becauſe every thing is to be obſerved the ſame as we propoſed in reducing Fractures of the Clavicles, *Book* II. *Chap.* V. *N.* 4. But this muſt be particularly regarded, to carefully remove the Injuries of the Neck, as ſoon as the Bones are replaced. If any Kind of Luxation requires an accurate Retention by Bandage, it muſt certainly be this of the Clavicle: eſpecially when the Luxation has happened ſome time before its Reduction. For, beſides, that the Clavicles have ſcarce any Muſcles to ſupport them, their Ligaments are generally ſo much ſtretched and weakened in this Caſe, that they are in no wiſe ſufficient to ſuſtain the Weight of the Arms. It will therefore be proper to apply ſuch a Bandage to the Neck, as we ſhall deſcribe at large in the Doctrine of Bandages. How the Clavicles are to be replaced.

IX. Such Luxations of the Clavicles as happen near the *Proceſſus Acromion*, are generally much the more difficult to diſcover; ſo obſcure, that as HIPPOCRATES (*Lib. de Articulis*, *N.* 62.) and PAREY witneſs, Abundance of the beſt Phyſicians, and Surgeons not a few, have been deceived in the *Diagnoſis* hereof, taking it to be a Luxation of the *Humerus*, and ſo have miſerably tortured the Patient to no Purpoſe. Whenever this Luxation happens, as PAREY obſerves, the ſuperior Part of the *Scapula* ſticks up; but in the Place where the Clavicles are ſeparated from the *Acromion* Proceſs, a Cavity may be obſerved. Moſt acute Pains ariſe, and the Arm itſelf cannot be moved or lifted up. If therefore the luxated Clavicles are not timely reduced, it is no wonder that we meet with ſome People, who, from neglecting the Caſe, entirely loſe the uſe of their Arms afterwards, ſo as that they cannot lift them up to their Head or Mouth. GALEN himſelf ſays, (*in Comment. in* HIPPOCRAT. *Lib.* I. *de Articulis*, *N.* 62.) "I "myſelf had once, in ſtruggling, my Clavicle ſo vaſtly ſeparated from the "*Acromion*, that there appeared a *Sinus* between the Bones, of near three "Fingers Breath." In the mean time, a ſtrict Bandage, continued about the Parts for forty Days to make the diſunited Bones again coaleſce, will be found very ſerviceable. (2.) near the *Acromion*.

CHAP.

CHAP. VII.

Of a LUXATION *of the* HUMERUS.

How the *Humerus* may be diſlocated.

I. THE *Humerus*, from the Length and Laxity of its Ligaments, the Largeneſs of its Motion, and the Shallowneſs of the Cavity in the *Scapula*, into which it is articulated, is thereby rendered of all Bones the moſt ſubject and eaſy to be luxated. The Head of this Bone may often be diſlocated under the Arm-pit, ſometimes forwards, ſometimes backwards, and even below the *Scapula*; but ſeldom perpendicularly downwards, and never directly upwards, unleſs the *Acromion* and *Coracoide* Proceſſes of the *Scapula* ſhould chance to be fractured at the ſame Time. Beſides, as long as the ſtrong *deltoide* and *bicipital* Muſcles of the *Humerus* remain intire, they greatly reſiſt and keep down the *Humerus* from being luxated upwards.

Signs of a luxated *Humerus*.

II. When the *Humerus is luxated downwards* (1.) there ſuddenly appears a Cavity, and upon preſſing with the Fingers, you will perceive a *Sinus*; but under the Arm there muſt be a Tumor, becauſe the Head of the Bone is thruſt there. (2.) The *Proceſſus Acromion* will ſeem to ſtick out further than uſual, becauſe of the adjacent *Sinus*. (3.) The luxated Arm will be longer than the other, and it cannot be lifted up towards the Head without violent Pain, and ſometimes it cannot be lifted up at all, or even extended. But when the *Humerus is luxated forwards* as well as downwards, there will be obſerved the ſame *Sinus* under the *Proceſſus Acromion* as before, and a Tumor will appear from the Head of the *Humerus* projecting towards the Breaſt, under the *Axilla:* The Arm itſelf alſo cannot be moved without exciting the moſt acute Pain. Laſtly, when the *Humerus is luxated backwards*, the *Cubitus* is thrown forwards towards the *Præcordia*, and the Head of the Bone makes a Protuberance in the Shoulder: The Arm itſelf cannot be bent nor extended, nor even pulled outwards from the Breaſt, without occaſioning the moſt violent Pains. But no Luxation of this Limb is attended with ſuch dangerous Symptoms, as when it is diſlocated forwards or inwards: Becauſe the luxated Head of the *Humerus* cannot avoid injuring the large Arteries and Nerves of the Arm; in conſequence of which, various Symptoms will ariſe.

Prognoſis.

III. If Aſſiſtance be had to theſe Lxations ſoon after they have been inflicted, before the bad Symptoms come on, the Reduction of them into their natural Places again may be effected without much Difficulty: More eſpecially, if the Bone be luxated directly downward or backward, it may be very eaſily reduced; but very difficultly when luxated inward, under the pectoral Muſcle. So it may be eaſily replaced, when the Arm retains its natural Length: But if it be ſhorter, and the Accident has been done ſome Time, or accompanied with Tumor, Inflammation, or a Fracture of the *Proceſſus Acromion*, it is then a very difficult Matter to reſtore the Limb to its former Strength and Motion. But when the Head of the *Humerus* grows faſt to ſome of the adjacent Parts under the Arm, it can ſeldom be reſtored by any means whatever. The Reduction is alſo more difficult in People that are ſtrong, or fat, than in ſuch as are lean, or weak.

IV. As

IV. As ſoon therefore as the Luxation is diſcovered in the *Humerus*, the ſafeſt Way will be to ſeat the Patient on the Floor, or on a low Stool, as at *Tab.* X. *Fig.* 3. A. Two ſtrong Aſſiſtants are to be placed on each Side the Patient, one of which B, ſhould ſecure his Body, and, if poſſible, the *Scapula* too [a], that it may not give way to the Extenſion: while the other C, lays firm hold of the luxated Arm with both his Hands, a little above the *Cubitus*, gradually and ſtrongly extending it. But before that Extenſion be made, the Surgeon himſelf D, ſhould have a large Napkin, of a ſufficient Length, tied at the Ends, and hung about his Neck ſo that the Knot may be behind; but the other Part of the Napkin E, muſt hang over his Breaſt. Then the Patient's Arm muſt be put through the Napkin up to the Shoulder, and the Surgeon at the ſame time lays hold of the Head of the *Humerus* with both his Hands. This done, he orders the Aſſiſtant to ſufficiently extend the Limb, and in the mean time he elevates himſelf the Head of the Patient's *Humerus* by the Napkin about his Neck, directing it with his Hands, till it ſlip into its former Cavity in the *Scapula*. But I would adviſe the Surgeon to move the Head of the *Humerus* one way and the other, according to the Manner in which it is luxated; which muſt be left entirely to his Diſcretion. And by this means I have happily reduced a great many recent, though not inveterate Luxations of this Joint, particularly three in one Month, and that by no other Aſſiſtance or Machinery.

How a Luxation of the *Humerus* is to be reduced.

V. Though the Method now deſcribed for reducing this Luxation ſeems to be the moſt ſafe, ready, and commodious of any hitherto invented for that Purpoſe; yet it is found, that the Extenſion cannot, by this Means, be made ſufficiently ſtrong in ſome Caſes; and this particularly when the Patient is very robuſt, or when the Caſe has been delayed ſome Time, without any Aſſiſtance. Therefore when one or two Aſſiſtants are not able to retain the Patient, and ſufficiently extend his Arm, it is much the beſt way to uſe a long Napkin with more Hands; or to apply the Girt of HILDANUS (*Tab.* VIII. *Fig.* 17.) about the *Humerus*, a little above the *Cubitus*, and to make the Extenſion by a Rope put through the two Hooks, and by another Rope faſtened to the middle of that, letting as many Aſſiſtants pull as may be ſufficient, according to the Circumſtances of the Caſe. But when the Extenſion is made with a great Force, it requires to be antagoniſed by a ſtill greater Force, to keep the Patient ſteady. Therefore it is proper to retain the Patient by two Aſſiſtants; and if they are not ſufficient, to uſe a long Napkin or Piece of ſtrong Linen, ſlit and made in form of the Slings at *Tab.* X. *Fig.* 1, 2. that the luxated *Humerus* may be put through the Slit up to the *Scapula*. The one half of this Linen Sling ſhould come over the Breaſt, the other half behind the Back, and both to meet afterwards together in a Knot: This is to be faſtened upon a Hook, or given into the Hands of ſeveral Aſſiſtants, or elſe it may be faſtened to a Beam, or ſome other fixed Point, ſo as to keep the Patient from being moved out of his Place. While this is performing, the Surgeon's immediate Buſineſs is, to accurately lift up, agitate, and reſtore the luxated Bone to its right Place, as we before directed. But when this Method alſo alone is inſufficient to extend the *Humerus*, it will be proper to apply to it the Pulley, *Tab.* VIII. *Fig.* 15. and keeping the Patient firm, to make a prudent

The bare Hands are ſometimes inſufficient for the Extenſion.

[a] A particular Stay might be contrived, for retaining the *Scapula*, by a long Napkin perforated in the Middle.

Extenſion of the *Humerus*, much as we propoſed before in a Fracture of the Thigh, *Book* II. *Chap.* VIII. *N.* III.

The *Ambe* of HIPPOCRATES.

VI. In theſe Kinds of Luxations, when the Hands were inſufficient for Extenſion, the Antients, and particularly HIPPOCRATES, made uſe of a Machine which they called (ἀμβὴ) *Ambe*, which may be ſeen delineated in *Tab.* X. *Fig.* 4 and 5. It conſiſts of a Pillar, or *Fulcrum* AA, and the moveable Lever BC, which is placed under and bound to the *Humerus* in the Manner of *Fig.* 5. by the Ligatures EEE. When this is done, the End of the Lever B is carefully and gradually preſſed downward; by which means the other End of the Lever C, is moved upward, and thus the luxated Arm is both extended, and its Head replaced at the ſame time. This was frequently uſed with ſo much Succeſs by them, that the Machine got a great Name, and is to this Day called the *Ambe* of HIPPOCRATES [a]. Notwithſtanding it was very ſucceſsful, and may be ſtill in ſuch Caſes, where the Head of the *Humerus* was luxated directly downward; yet, when the Head of the *Humerus* is luxated on one Side, or beneath the Neck of the *Scapula*, as generally happens, the Inſtrument elevating only directly upwards could not reduce the Luxation, but contuſed or lacerated the adjacent Parts, or elſe threw up and preſſed againſt the Neck of the *Scapula*, often exciting violent Pains, in ſuch Manner that (to ſay nothing now of its other Defects) it has been generally neglected by moſt for this long while, and is now wholly rejected.

Of other Artifices for this Purpoſe.

VII. To proceed, we muſt not omit taking notice here, that there are ſeveral other Methods and Contrivances invented, not only by the Antients, but alſo many of the modern Phyſicians and Surgeons, for reducing a Luxation of the *Humerus*. Thoſe of the Antients are delineated by ORIBASIUS (*Lib. de Machinamentis*,) PAREY (in his *Surgery*, *Book* XV.) GERSDORFF, BRUNSWIG, SCULTETUS (in their *Chirurgical Writings*) and other eminent Surgeons. As for the modern Contrivances, two of their Machines are publiſhed in the *Acta Eruditor. Ann.* 1683, *pag.* 37. another in JUNGKENII *Chirurgica Germanica*, *pag.* 168. where he treats of Luxations; another in PURMANNI *Chirurg. Curioſ. Tab.* XIV. *pag.* 692; and ſtill another in PETIT's *Treatiſe on Diſeaſes of the Bones*. And though theſe latter ſeem to be each in great Eſteem with their own Authors, every one thinking he had mended the Defects of his Predeceſſors; yet there are ſome of the *French* Surgeons who eſteem and publickly declare them to be either unneceſſary, or leſs ſuitable than the *Ambe* of HIPPOCRATES [b]. There are even ſome who look upon all Machines as unneceſſary in this Caſe, but the Hands, and Napkins, or Slings; as GOUE, a *French* Man too, in his *Surgery* [c].

Of PETIT's Machine.

VIII. But becauſe PETIT is an ingenious Surgeon, and well verſed in his Profeſſion, I thought it would be worth while to exhibit here the Machine which he ſo vaſtly commends, and to give a ſhort Deſcription thereof. See *Plate* X. *Fig.* 7. But ſuch as deſire a more full Account, may conſult the Author's Book of Inſtruments itſelf [d]. PETIT made it his Buſineſs to contrive his Machine ſo as not only to make a ſufficient Extenſion of the Limb, which

[a] See a Book entitled, *Diſſertation en forme de Lettre.* [b] See ditto.

[c] DOUGLAS too is of Opinion, that Writers in Surgery have been highly blameable in recommending uſeleſs and ridiculous Machines in a Luxation of the *Humerus*. *Op. Chirurg. Syll. pag.* 47.

[d] As PETIT's Figures are from Wooden Plates, and but very indifferent, I have endeavoured to repreſent them as clearly as poſſible, that they may be better underſtood.

others had invented Means to anſwer very well before, but alſo to make a counter Extenſion or Reſiſtance at the ſame time, to retain the Patient, and particularly his *Scapula*, ſufficiently firm from giving way to the Extenſion of the Limb made by the Inſtrument. With this View he made a ſort of Buttreſs or Supporter *(l'Archoutant)* of Ticken, a Foot long, of ſufficient Strength, and lined with Leather, as at *Tab.* X. *Fig.* 7. The Arm is to be firſt put through the Opening A, ſo as to make one End B come over the Breaſt, and the other End C to go croſs the Back. Its two Holes, DD, let in the two Horns or Legs of the Machine, *Fig.* 6. *a a*, whoſe other End, B, is lodged upon the Ground. In this Machine there are ſeveral little Pullies *c c*, *c c*, as in the *Poly-ſpaſton* of *Tab.* VIII. *Fig.* 16. round which paſſes the Rope *d d d:* There is alſo a moveable Handle E, by which the Rope is wound up through the Pullies, and the luxated Arm by that means extended. But that the Arm may be the better extended, he uſes a peculiar Sling AA, *Fig.* 8. made of ſoft and double Leather, fourteen Inches long: This he faſtens ſtrongly round the lower Part of the *Os Humeri*, a little above the Elbow; the Skin being firſt pulled upwards, it is to be kept firm upon the Limb by means of a Silk Cord, three Quarters of an Ell long, ſewed in a particular Manner to the Leather of the Sling, and to be faſtened by a Knot at the two Ends *b b:* To this Silk Cord is faſtened another Sling *c d e*, by two moveable Loops *f f*, to which is to be annexed the Rope *d d d*, which paſſes round the Pullies of the Machine. The Apparatus being all rightly fitted, he orders his Aſſiſtant to wind up the Rope by the Handle E, *Fig.* 6; the Rope becomes by that means ſtretched, and the Arm to which it is faſtened is gradually extended. In the mean time the Surgeon directs the Head of the *Humerus* with his Hands, that it may again obtain its natural Place, which it very often does of its own accord, without the Direction of the Surgeon [a].

IX. But to give my Opinion impartially concerning the Uſe of Machines for reducing a Luxation of the *Humerus*, I muſt needs ſay, that the Surgeon's Hands and a Napkin, with ſtrong and dextrous Aſſiſtants to make the Extenſion, and hold the Patient firm, will, of themſelves, be generally ſufficient for the Buſineſs: But if any one be willing to uſe other Methods, he may pitch upon thoſe as the beſt, which ſufficiently extend the Bones, and equally ſtretch the Muſcles every way alike, that the Head of the *Humerus* may be aptly replaced. Upon this Principle we may readily judge whether the *Ambe* of HIPPOCRATES be ſufficiently proper or no to be applied in this Caſe: Or the ſtill more uncertain Method of pulling and extending the luxated Arm over a Gate, Ladder, or Beam, by a Couple of tall and ſtrong Aſſiſtants, in ſuch Manner as to lift the Patient off his Legs: Or when a luſty and ſtrong Aſſiſtant ſits down on the Floor, and preſently laying hold of the Patient's Arm, ſuddenly raiſes himſelf up thereby: Or laſtly, when the Patient is ſeated on the Ground; and by placing the Foot under the Head of the *Humerus*, it is violently pulled upward, or any other way extended: All which Methods are handled at large by PAREY, in his *Surgery*, *Book* XV. But here it muſt be cautiouſly obſerved over and over, that

Of other Methods leſs in uſe.

[a] This Machine of PETIT, and his Treatment of a Luxation of the *Humerus*, is ſmartly cenſured in a *French* Journal *(des Sçavans)* M. *March*, 1734. (which the Author of the late quoted Diſſertation has ſeconded) and many notorious Errors are there diſcovered.

the Nerves, Veins, Arteries, Muſcles, and the Bones themſelves, be not contuſed or broke, by the too great Strength and Suddenneſs of the Extenſion. That ſuch Accidents as theſe may readily happen in a rough Extenſion of the luxated Arm over a Gate, *&c.* where the Patient is ſuſpended by it, we ſhall find no room to doubt, eſpecially if we conſider the Reaſons and Inſtances cited by PETIT (in his Chapter on a Luxation of the *Humerus*) and others. And ſince this is the Caſe, the Surgeon's principal Care and Buſineſs in the Extenſion will be, to let the Arm be ſtretched out with a Force ſtrong enough, but equable, before he ſtrives to replace the luxated Head of the Bone: Otherwiſe he acts to no Purpoſe, or to a very bad one, by bruiſing and lacerating the neighbouring Parts.

A new Machine.

X. There is ſtill another new and very conſiderable Machine with a Pulley, which I received not long ago from a very eminent Surgeon, deſigned for the Reduction of an obſtinate and inveterate Luxation of the *Humerus*; whoſe great Advantages he very much praiſed and recommended to me: But becauſe I have not yet had Opportunity to uſe it, and ſo could not experience its Effects, I muſt refer the Deſcription thereof to another Opportunity.

CHAP. VIII.

Of a LUXATION *of the* CUBITUS.

In what manner the *Cubitus* may be luxated.

I. THE *Cubitus* conſiſting of two Bones, the *Ulna* and the *Radius*, is articulated by *Ginglymus*, which the *French* call *Charniere*, as is evident from what is ſaid of theſe Bones in the Writings of Anatomiſts. The Connection of theſe Bones is ſuch, that the *Ulna* or *Cubitus*, as being the largeſt Bone, and ſeated in the inferior Part of the Arm, does, of itſelf, perform the whole Flexion and Extenſion of the Arm, yet it cannot perform that Motion without carrying the *Radius* along with it: So that the *Radius* always follows the *Ulna* in Flexion and Extenſion. But on the other hand, the *Radius* may be turned along with the Hand both inward and outward, without at all moving or bending the *Ulna:* As when the Pronation and Supination of the Hand is made thereby. Both theſe Bones of the *Cubitus* are ſo articulated with the lower Head of the *Os Humeri*, that large Protuberances are received into deep Cavities or Grooves, and the whole inveſted and faſtened with exceeding ſtrong Ligaments. So that notwithſtanding the *Cubitus* may be luxated in all four Directions, outward, inward, forward, and backward, yet it is but ſeldom that it ſuffers a perfect or entire Diſlocation. Unleſs the upper Part of the *Ulna*, called *Olecranon*, be broken, or the Ligaments of the *Cubitus* much weakened, by ſome very great external Violence.

How to diſcover a Luxation of the *Cubitus.*

II. If the *Cubitus be luxated backward*, which is the moſt frequent of all others, then the Arm becomes crooked and ſhorter, and it cannot be extended. In the inward Part of the Bend of the Arm, the Head of the *Humerus* may be obſerved to ſtick out; in the back Part of the ſame, the Head of the *Ulna* or *Olecranon* will be protuberant, and between both Bones will appear a *Sinus* or Cavity. But it very ſeldom happens that the *Cubitus is luxated forward*, from the Largeneſs of the *Olecranon*; unleſs that be fractured at the ſame

time. But if this ſhould happen, the Head of the *Humerus* will ſtick out behind, and that of the *Cubitus* before; and there will be a Cavity more or leſs in Proportion to the Degree of the Luxation. When the *Cubitus is luxated externally*, the Protuberance appears on the Outſide of the *Cubitus*; and the contrary when luxated inwards. To conclude, unleſs the Ligaments and Muſcles of the *Cubitus* are quite broken in two, it is ſo far from being capable of ſuffering a perfect Diſlocation, that no more can happen to it than a Subluxation, *i. e.* it can recede but a very little way out of its right Place. But whatever of this Kind happens, the Caſe may be very eaſily underſtood, by feeling and inſpecting the Part, if there be no Tumor: But if the Joint be much ſwelled, it is very difficult to be diſcovered.

Prognoſis.

III. Since, in the more violent Kind of theſe Luxations of the *Cubitus*, the Tendons and Ligaments muſt be very much ſtrained; it is no wonder (if theſe be not ſpeedily helped) that there ſhould follow grievous Pains, Tumors, Inflammations, Convulſions, Vomiting, Fever, and at length Gangrene and Death: An ample Witneſs whereof is PAREY, in *Book* XIV. *Chap.* 18. and *Book* XVIII. *Chap.* 33. And to make no Diſſimulation in the Caſe, when the *Cubitus* is diſlocated, it is a very difficult Matter to replace it again, by reaſon of its Inequalities and ſtrong Ligaments: And this more eſpecially when the Luxation is very violent or inveterate; for the ſlighter and more recent the Luxation, the more eaſy will be the Reduction.

How a Luxation of the Cubitus is to be replaced.

IV. Be the Luxation however more or leſs, the Patient muſt be ſpeedily placed in a Chair, and both Parts of the Limb, the *Humerus* and the *Cubitus*, muſt be extended in oppoſite Directions, by two ſtout Aſſiſtants, till the Muſcles are found pretty tight, with a free Space between the Bones. Then the luxated Bone muſt be replaced with the Surgeon's bare Hands, or together with Bandages: And that the Proceſſes may fall into their *Sinuſes*, the *Cubitus* muſt be afterwards ſuddenly bent. But if the Tendons and Ligaments are ſo violently ſtrained, that they can ſcarce perform their Office; it will not be improper to anoint them well with emollient Oils, Ointments, or the Fat of Animals, or to apply emollient Fomentations and Cataplaſms. Where the bare Hands are not ſufficient to make a proper Extenſion upon the Limb in this Caſe, it will be very proper to uſe the Means and Inſtruments which we before propoſed in *Book* II. *Chap.* VIII. *N.* 3 and 4.

How the Cubitus is to be treated after Reduction.

V. As ſoon as the Reduction has been by theſe Means effected, the Articulation muſt be bound up with a proper Bandage, and the Arm is to be afterwards ſuſpended in a Napkin or Sling about the Neck. But Care muſt be taken, as HIPPOCRATES himſelf adviſes, that the Bandage be not ſuffered to be on too long, nor the Arm to be kept all the Time ſtill, without ſome gentle Motion. For thus there would be Danger of the Mucilage of the Joint becoming inſpiſſated, whereby the Articulation might become ſtiff, and quite loſe its Motion. But happily to prevent this, it is very neceſſary to undoe the Bandage every, or every other Day, and to gently bend and extend the Limb: Afterwards, Compreſſes dipped in burnt Wine, may be applied hot, and held on firm with a Bandage, till the Swelling and Inflammation, if there be any, ſubſide, and the Ligaments and Articulation regain their former Strength.

CHAP.

CHAP. IX.

On LUXATIONS *of the* HAND, CARPUS, METACARPUS, *and* FINGERS.

Luxation of the Hand.

I. NOtwithſtanding the Hand is very accurately connected to the two preceding Bones, and particularly to the *Radius*, by means of the *Carpus* and ſtrong Ligaments, yet it ſometimes ſuffers Luxation in all four Directions. But it is generally not ſo eaſy to be luxated on either Side, as forward or backward, becauſe of the two Proceſſes of the *Radius* and *Ulna*, which guard it on each Side. The Hand is ſaid to be *luxated forwards* or *inwards*, when it recedes from the Muſcles which bend the Fingers; to be *luxated backward*, when it departs from the Muſcles which extend the Fingers. Much alſo in the ſame manner, the Hand is judged to be *luxated outward*, when the *Carpus* makes a Tumor near the Thumb, and a Cavity near the little Finger: To be *luxated inward*, when the contrary happens. This being rightly conſidered, it will not appear difficult to diſtinguiſh the Signs by which we are to diſcover a Luxation of the Hand.

Symptoms and *Prognoſis*.

II. For, if a Luxation of this Kind ſhould happen, it can hardly avoid being accompanied with violent Pains, on account of the Ligaments (though ſtrong) being too vehemently ſtrained: The Fingers alſo cannot be bent nor extended, from the violent Compreſſion of their Tendons. Upon which account, it is no wonder if there follows grievous Inflammation, Tumor, Abſceſs, Stiffneſs of the Joint, Gangrene and *Sphacelus*, or *Caries* of the ſpongy Bones in the *Carpus*; which evils are ſeldom remedied but by amputating the Limb. But when the Luxation is but ſlight and recent, the Cure may be effected with much more Eaſe, and the Diſlocation will not be attended with ſuch grievous Symptoms.

How a Luxation of the Hand is to be reduced.

III. It therefore ſeems to be the ſafeſt Way immediately to reduce what is diſplaced. And that this may ſucceed the better, two Things are to be chiefly regarded: (1.) That the luxated Hand be ſufficiently extended by two Aſſiſtants, one of which is to lay hold of the Hand, and the other of the *Humerus*, pulling in oppoſite Directions: (2.) That the Part of the extended Hand, where the *Sinus* is, be placed on a Table, or ſome other flat Body, that whatever ſticks up may be depreſſed. By which Method the Hand, in whatever Part luxated, may be very readily reduced into its natural Seat.

Luxation of the Carpal Bones.

IV. It alſo ſometimes happens, that one or two of the eight little Bones of the *Carpus* are luxated and diſtorted from their natural Seat by ſome external Violence. When this happens, there will be perceived a Tumor in one Part, and a Cavity in another, which may be alſo felt by the Fingers; beſides, violent Pains will be felt by the Patient. For the reſt, as this kind of Luxation is very eaſily diſcovered, partly by the Sight, and partly alſo by Feeling; ſo, when it is recent, it is almoſt as readily cured, letting the Hand be extended in the Manner we before propoſed (at *N.* III.) and the diſlocated Bone be afterwards forced into its Place.

Luxation of the *Metacarpus*.

V. The four ſmall Bones, which are found in the *Metacarpus*, or Palm of the Hand, may be ſometimes luxated from the *Carpus* itſelf, to which their upper Parts are connected: Which uſually happens from ſome external Violence; notwithſtanding they have a natural Inclination to reſiſt ſuch Luxation. For the

two

two Bones which are ſeated in the Middle between the two other external Ones, cannot be diſlocated to either Side: As the two external Ones which ſuſtain the firſt and little Fingers cannot be luxated inwardly, but are more eaſily driven outward: Tho' each of them may be luxated on the fore or back Part of the Hand. But which ever of theſe happens, the particular Diſorder may be diſcovered and examined by feeling and inſpecting, and the Cure may be carried on in altogether the ſame Method which we directed before at § IV.

VI. Laſtly, the Bones of the Fingers, to which we join thoſe of the Thumbs, are liable to Luxation at each of their Articulations, and that in ſeveral Directions. But theſe Accidents, if recent, are both very eaſy to diſcover and cure. For the Ligaments being not very robuſt, the Fat and Muſcles thin, and the *Sinuſes* of the Articulations ſhallow, render the Extenſion very eaſy, and the Reduction of them into their former Places may be done very readily. While one Hand of the Surgeon extends the Finger, he ſtrives with his other to replace the Bones in their natural Seat. The Bandage proper to dreſs the Finger after Reduction will be explained more at large in the third Part of this Book, where we treat profeſſedly on Bandages. Luxation of the Fingers.

CHAP. X.

Of a LUXATION *of the* THIGH.

I. VERY rare is it that the Head of the thigh Bone is diſplaced out of its *Acetabulum*; tho' formerly it was ſuppoſed to be pretty frequent, the Phyſicians taking a Fracture thereof for a Luxation, as we have obſerved in treating on Fractures. See *Book* II. *Chap.* VIII. § VI. and *Book* III. *Chap.* I. § IX. The Reaſon whereof may be taken from the Articulation itſelf. (1.) How very deep is the *Sinus*, called by the Antients *Sinus Coxæ*, and by the Moderns *Acetabulum*, into which the Head of the Thigh-Bone is received. (2.) With what a broad concave Cartilage is almoſt the whole Head of that Bone covered: (3.) How ſtrong are the Ligaments with which it is faſtened. (4.) How greatly is it defended with exceeding ſtout and thick Muſcles. (5.) But how very brittle is the Neck of this Bone beyond any other Part thereof. From all which it appears, that the Neck muſt be far more frequently and eaſily broke, eſpecially in Adults, than its Head diſlocated[a]. And tho' ſomething of this Kind may ſometimes happen, ſo as to make the Head of the Thigh-Bone ſlip out of its *Acetabulum*; yet that generally proceeds more from internal than external Cauſes[b]. For we find it has been obſerved by very ſkilful Phyſitians, that the Ligaments of the Thigh-Bone, tho' very ſtrong, may be by various Cauſes, and particularly by a Flux of Humours, ſo relaxed and weakened, as to let the Head of that Bone ſlip ſpontaneouſly out of its *Acetabulum*: So that it ſhould ſeem no great Wonder if the Thigh ſhould be ſometimes luxated even The Thigh ſeldom luxated.

[a] To theſe we may add that the celebrated CHESELDEN in his Anatomy ſays, that upon opening two Subjects, whoſe Caſe every body thought to be a Luxation, the Neck of this Bone was found fractured. And WISEMAN, with other eminent Surgeons, wholly deny any Luxation in this.

[b] RUYSCH obſerves that the Head of the Thigh-Bone is ſeldom diſlocated by external Force; but frequently by Humours from within. See his *Theſaur. Anatom.*

while

while the Patient lies in Bed, without any external Violence, as I have sometimes seen; so that when they rise, one Leg appears longer or shorter than the other, and seems as if it were unhinged. *Vid.* HIPPOC. *Aph.* 59, 60. § VI. ZWINGER *Theat. Pract. Part.* II. *pag.* 110. *sub tit. Luxatio.*

Happens oftener in Infants than Adults.

II. But this Case does not happen so easy in robust Adults, as in such as are more young and tender, as we before observed. For I remember to have several Times observed this Case of a spontaneous Luxation, though other Physicians and Surgeons were of a contrary Opinion, because they could not find that any external Violence had gone before: But though it was preceded by no external Violence, Experience has taught me, that the Head of the Thigh-bone may thus slip out of its *Acetabulum*; being the Consequence of preternatural Humors, or some other Disease, whereby the Ligaments and Articulation are rendered infirm.

When the Thigh is luxated, it is generally perfectly so.

III. Whenever the said Head of the Thigh-bone is thrust out, it is almost always wholly displaced, so as to make a perfect Luxation. The exact Roundness of this Head, with the great Force of the circumjacent Muscles, and the Narrowness of the Sides of the *Acetabulum*, will not admit the Bone to be dislocated a little way only: For as soon as the Head of this Bone is thrust up to the Edge of the *Acetabulum*, it must unavoidably either turn quite out, or else fall back again into its right Place [a]. Yet there are some who hold that the Thigh may suffer an imperfect Luxation.

The Thigh may be luxated in several Directions.

IV. The Thigh is usually luxated four Ways; *upward*, *downward*, *backward*, and *forward:* But is is most frequently dislocated downwards and inwards, towards the large *Foramen* in the *Os Pubis* [b]. For besides that the cartalaginous Defence on the lower Part of the *Acetabulum* is not so high as the rest, the *Ligamentum rotundum* is found to give way more easily in that Part than any other: And lastly, the adjacent Muscles are found to be weakest in their Resistance on this Part, being insufficient to keep the Head of this Bone from slipping out. And then there is a certain Eminence in this Edge of the *Acetabulum*, which keeps the Head of the *Os Femoris* from falling back again into its right Place. But if the Head of this Bone be displaced outwards, it generally slips upwards at the same time; it being scarce possible but the very strong Muscles of the Thigh must then draw the Bone upwards, and then there is no Eminence there, in the Edge of the *Acetabulum*, to resist the Head of the Bone in that Passage. But should it at any time be luxated by an external Force, there must certainly be a Rupture of the round Ligament; as some Authors have observed.

Signs of the Thigh luxated (1.) downward and forward.

V. When the Thigh is dislocated forwards and downwards, which is what usually happens, the Leg hangs straddling outward, and is longer than the other: Also the Knee and Foot turn outwards: The Head of the Bone itself will be felt near the lower Part of the *Inguen* and *Os Pubis*. Sometimes there is a Suppression of Urine in this Case; when some Nerve, which communicates with the Bladder, is violently compressed. In the Buttock may be perceived a Cavity, from the *Trochanter Major* and the rest of the Bone being displaced: And if the Thigh-bone be not timely replaced into its *Acetabulum*, the whole Limb withers

[a] See WISEMAN's Surgery, *pag. m.* 463.
[b] As VERDUG has observed, *Operat. Chirurg.* pag. m. 300.

shortly

ſhortly afterwards [a]. And this is the Reaſon why the Patient can bear little or no Streſs upon that Limb, but muſt always incline and throw the Weight of his Body upon the other, unleſs he would fall down. In like manner when they walk or go forward, the Perſon muſt move that Limb in the Form of a Semicircle; but as for the Body itſelf, it is obliged to be ſupported under the Arms by Aſſiſtants, or elſe by Crutches and Sticks. Though there are not wanting particular Caſes, ſome of which I have been Witneſs to, where the Head of the luxated Thigh-bone has grown ſo firmly to the adjacent Parts without the *Acetabulum*, as to become, in proceſs of Time, ſo ſtrong as to ſupport the Body without Crutches or Sticks, though they always halted in walking.

VI. But if the Thigh-bone be diſplaced backward, it is uſually drawn upward alſo at the ſame time, as we before obſerved. Hence there will be perceived a Cavity behind the *Inguen*; but upon the Haunch or Buttock, a Tumor; becauſe the Head and *Trochanter* of this Bone will be thruſt there. The Tumor in the Haunch being thruſt upwards, the reſt of the Limb will become ſhorter than the other, and the Foot will ſeem to turn inwards: The Heel will not touch the Ground, and ſo the Perſon will ſeem to ſtand upon his Toes. And laſtly, the luxated Limb may be bent with more Eaſe than extended: Alſo the Body is uſually ſuſtained more firmly by this Limb when luxated backward than forward; becauſe in the firſt Caſe, the Feet are removed farther from each other. And this is the Reaſon why a great many in Caſes of this Kind which have been cured by Surgeons without reducing the Bone, are able to ſtand firmly and walk, eſpecially if they have a Shoe with a very high Heel to it. But there generally follows ſomething of a ſlight withering or decay in the Limb afterwards, from the Nerves being in ſome Meaſure Compreſſed: Though this Accident is much ſlighter here than at § V. Laſtly, it is extremely rare that the Thigh is luxated forward or backward, without being alſo drawn upward or downward, as we before obſerved: But if it ſhould ſo happen, it may be evidently diſcovered by what we have been juſt now ſaying, and from conſidering the Structure of the Articulation. (2.) upward and outward.

VII. As it is very difficult to diſcover whether the Thigh-bone be diſlocated or fractured, both by feeling and inſpecting, becauſe of the great Thickneſs of the Muſcles and Integuments; it is therefore, in my Opinion, a Matter of ſome Conſequence to propoſe the following Signs, which we recommend for diſcerning one from the other. We do not without Reaſon judge the Thigh to be luxated (1.) when we find the Ligaments of the Bone have been relaxed by ſome preceding Congeſtion of Humors, and when no external Violence has been exerted upon it, eſpecially in young Patients: (2.) When neither the Symptoms, Pain, Tumor, or Inflammation follow: And laſtly, (3.) when the whole Limb may be bent and turned about at the *Acetabulum* without any cruſhing of the Bones, which is otherwiſe common in Fractures. The contrary of theſe Signs are ſtrong Indications that a Fracture is preſent: More particularly if the Foot in grown Perſons be ſhorter, from the Injury of any external Violence, and you hear a grating of the Bones in moving the Limb. *How to diſtinguiſh between a Fracture and a Luxation of the Thigh.*

VIII. If it be difficult to diſcover whether the Thigh be fractured or luxated, as we have before made evident; its proper Treatment and Cure will be found much more ſo. See *Book* III. *Chap.* I. § IX. For this Difficulty there are many Reaſons. For (1.) the Force and Thickneſs of the adjacent Muſcles *Prognoſis.*

[a] See HIPPOCRAT. Sect. V. *Aph.* 59, and 60.

themſelves hinder the Thigh from having a ſufficient Extenſion; eſpecially if it be in the ſtronger Sort of Men. Hence, (2.) for the ſame Reaſon the Reduction of the Bone will be very difficult to effect; and when it is effected, it will be a hard Matter to diſcover. And (3.) if the Thigh ſhould happen to be replaced quite home as it ſhould be, yet there is great Danger of its ſlipping out again, from the Laxity of the Ligaments and Slipperineſs of the Parts. To which we may add (4.) that the Ligaments happen to be ſometimes quite broke or lacerated from the Greatneſs of the external Violence. And we muſt not forget that (5.) the Mucilage of the Joint becomes often ſo inſpiſſated in the *Acetabulum*, as not only to prevent its Reduction, but often alſo, to thruſt it out again when once replaced, (6.) in Infants the Head of the luxated Bone increaſes, and at the ſame time the *Sinus* contracts; that if there be not a ſpeedy Reduction, there can be none. So that it is no Wonder if ſuch become halt or lame, as have their Thigh-bone luxated, and reduced not at all, or elſe when it is too late. Yet in this Diſlocation in a younger Patient, if it be recent, and the Ligaments are not broke, there are Hopes of reducing it; eſpecially, if you apply proper Remedies. For in this Stage of Life the Muſcles are very pliant, and the Bone is eaſily extended, and replaced: But it is not ſo eaſily retained there, in conſequence of the Weakneſs and Flaccidity of the Parts.

Cure of the Thigh luxated forward and downward.

IX. The luxated Bone is always to be replaced in a Method agreeable to the Nature and Direction of the Diſlocation. When it is diſplaced forwards and downwards, the Patient is to be laid flat upon his Back on a Table: Then a Linen Napkin or ſtrong Sling is to be made faſt over the Groin about the Part affected, ſo that one End of the Sling may come over the Belly, and the other over the Nates and Back, to be both tied together in a Knot upon the Spine of the *Os Ileum*, and afterwards faſtened to a Hook fixed in ſome Poſt, or held firm by ſome Aſſiſtants; rather the firſt, if we uſe the *Polyſpaſton* or Pulley, to retain the Patient's Body firm from giving way in the Extenſion. In like manner, at the Bottom of the Thigh, a little above the Knee, there muſt be alſo faſtened another Napkin, Sling, or the Girt of HILDANUS at *Tab.* VIII. *Fig.* 17. with a Compreſs between it and the Thigh; or PETIT's Sling, *Plate* X. *Fig.* 8. Both the Slings being drawn tight, the Thigh is to be extended, not vehemently, but only ſo much as is ſufficient to draw the Bone out of its *Sinus*, that it may be replaced into its *Acetabulum* by the Surgeon's Hands: One Hand is to preſs the Head of the Thigh-bone outward, while the other conducts the Knee inwards: Or, the Reduction may be made by Napkins, faſtened round the Extremities of the Thigh like Slings, much as in a Luxation of the *Humerus*; which will be more likely to ſucceed, if the Knee be at the ſame time preſſed inwards by the Hands. When the fore-recited Means are not ſufficient to make the Extenſion, it will be neceſſary to make Uſe of the *Polyſpaſton* or Pulley which we propoſed before in *Book* II. *Chap.* VIII. §IV. As ſoon as the Thigh is found to be ſufficiently extended, the Surgeon muſt take particular Care to reſtore the luxated Head of the Thigh-bone with his Hands from the *Os Pubis* into its former Seat.

X. Whenever the Thigh is luxated backward, the Patient is to be placed flat on a Table, with his Face downward, and the Thigh is to be extended in directly the ſame Manner, but a little more ſtrongly than we juſt now propoſed: and the Reduction is to be effected afterwards by the Surgeon's Hands, an Aſſiſtant

ſtant in the mean time extending the Limb, and turning it inwards. By this Method the Head of the Thigh-bone generally ſlips very readily again into its *Acetabulum*. This being all rightly effected, the next Buſineſs is to let the diſordered Limb be well bound up, as we ſhall teach in the Doctrine of Bandages, and the Patient is to be cloſely reconciled to reſt in his Bed for three or four Weeks, not without the Uſe of ſtrengthening Medicines.

The Uſe of Petit's Machine.

XI. But in either Caſe, whether the Thigh be luxated forward and downward or backward and upward, Petit greatly recommends his Machine before deſcribed in the Chapter on a Luxation of the *Humerus*; becauſe the Hand and other Inſtruments are here very often inſufficient, becauſe of the many ſtrong Muſcles in this Part. But to make uſe thereof, the *Retinaculum* or Stay delineated at *Tab.* X. *Fig.* 7. is required to be not ſo broad, and it may be without the Opening A, (See *Plate* X. *Fig.* 9.) as the Thigh is not to be tranſmitted through it: But the Middle thereof is to be applied to the Tubercle of the *Iſchium*, one End being folded behind, and the other before. The Patient is to be placed on his ſound Side, that the luxated Thigh may lie upwards; but the Machine itſelf is to be placed between the Thighs, the Knee of the diſtorted Side being a little bent. The Sling *Fig.* 8. *Tab.* X. is to be faſtened firmly round the lower Head of the Thigh, above the Knee, the Skin being firſt drawn tight upwards, as we adviſed before in a Luxation of the *Humerus:* It is then to be firmly faſtened to the Rope paſſing round the Pullies of the Machine *Fig.* 6. *d d.* And laſtly, the Legs or Horns of the Machine *a a*, are to be put through the Apertures in the *Retinaculum* D D, *Fig.* 7. and by winding up the Rope by the Hand E, *Fig.* 6. it is to be gradually and carefully extended, till the Surgeon perceives by the Limb that it is ſufficient. This done, the Surgeon ſtrives to reduce the Head of the Thigh-bone into its *Acetabulum*, from the *Sinus* where it was lodged, as we have before directed at § IX.

More particularly in a Luxation forward and downward.

XII. But more particularly, if the Thigh be luxated forward and downward, and ſticks near the large *Foramen* in the *Os Pubis*, the Reduction in this Caſe is often very difficult. Petit has in this Caſe ſubſtituted for the Legs or Horns of the Machine *a a Fig.* 6. others which are expreſſed at *Fig.* 10. which have at their Ends tranſverſe or lunar Proceſſes: One of theſe A, he applies to the *Os Ileum*, and the other B, to the Middle of the Thigh: He afterwards ties a Napkin about the Thigh, near the *Inguen*, which he makes faſt to the Rope about the Pullies of the Machine. He then makes the Extenſion by turning the Handle of the Machine, by which means the Inſtrument exerts its Force in three different Places: The Part A retains the Patient firm and reſiſts the *Os Ileum* as an immoveable *Fulcrum*; the Part B, when the Rope is drawn tight, turns the lower Part of the Thigh inwards; but the Napkin, which is faſtened about the upper Part of the Thigh, does by means of the Rope draw it outward; all which Motions are neceſſary to be performed, in order to reduce this Luxation. But be cautious againſt too ſtrong an Extenſion, becauſe the Limb is already too long of itſelf: Yet the Extenſion ought to be continued till the Surgeon can replace the Bone from the *Sinus*, where it was lodged, into its *Acetabulum:* For if it be let looſe before this is effected, the Extenſion will be found to have been altogether uſeleſs, and muſt be repeated again.

XIII. If it ſhould ſuffer an imperfect Luxation (which yet very ſeldom, if ever happens, as we obſerved at § III.) and if the Head of the Bone ſhould ſtop upon the lower Part of the *Acetabulum*, the upper Part of the Thigh is then to be thruſt outwards with one Hand, while the lower Part is puſhed inwards by the other, and ſo the Bone may be properly reduced. But if the Head of the Thigh-bone ſhould ſtick upon the Edge of the *Acetabulum* backward, a Method contrary to the former muſt be made uſe of; *viz.* the upper Part of the Thigh muſt be thruſt inwards by one Hand, while the other Hand conducts the lower Part of the Thigh outwards.

XIV. When the Bone is replaced, it muſt be retained by the Application of a proper Bandage, called *Spica Inguinalis*, which you will find deſcribed in my Treatiſe on Bandages. And in younger Patients, where the Miſchief ariſes from a Flux of Humours, ſtrengthening Medicines muſt be given. And for the Revulſion of thoſe Humours an Iſſue ſhould be made in the Arm of the ſound Side; to which ſuch Virtues are attributed, that to this only MULLER aſcribes the Cure of theſe Luxations in young Patients. See his Diſſertation on Diſlocations of the Thigh, delivered at *Hale* in the Year 1738.

CHAP. XI.

Of a LUXATION *of the* PATELLA *and* KNEE, *or* TIBIA *and* FIBULA.

Luxation of the *Patella*.

I. THE *Patella* is uſually luxated moſtly on the internal or external Side of the Joint; but if we may credit ſome Phyſicians, it is alſo ſometimes diſplaced both above and below the ſame. But whenever the Knee is perfectly luxated, the *Patella* can ſcarce avoid being diſplaced at the ſame time, becauſe of its ſtrong Connection to the Thigh and *Tibia*. I muſt confeſs there are more than a few among the common Surgeons, who, from their Unſkilfullneſs in Anatomy, and particularly Oſteology, are quite doubtful and at a Loſs what to think about this Caſe; nor can they tell what is diſlocated when it happens. Hence it is no wonder if they treat this unknown Hurt of the Joint, as a Luxation made in the Knee itſelf, putting the Patient into various and painful Poſtures, and torturing him by extending and preſſing the Limb to no Purpoſe. But if one well verſed in Anatomy and the Structure of the Articulation ſhould examine the Caſe with a little more Exactneſs, there is no room to doubt but from comparing the diſordered and ſound Limb, he will be able to judge readily whether or no, or in what Part the *Patella* is luxated, and what Method will be proper to be taken for its Cure.

How it is to be replaced.

II. The Reduction of a luxated *Patella* is uſually no very great Difficulty, if the Patient be laid flat on his Back upon a Table or Bed, or if he be laid in that Poſture upon an even Floor, ſo as that the Leg may be pulled out ſtrait by an Aſſiſtant. For then the Surgeon may firmly graſp the *Patella* with his Fingers, and afterwards preſs it ſtrongly into its right Place; which may be alſo effected if the Patient ſtands upright. When this is done, there remains nothing but to carefully bind up the diſordered Part, and to let the Patient reſt quietly for ſome Days, ſometimes gently bending and extending his Leg to prevent

vent it from growing ſtiff: 'Till the Pains are gone off, and the Limb has recovered its former Strength.

III. A Luxation of the Knee is properly ſo, when the *Tibia* recedes from under the *Femur*. The Leg is ſometimes luxated from the Baſis of the Thigh-bone, either on the out or inſide, or backwards: Seldom or never forwards, unleſs it be forced and driven very violently that way; becauſe forwards, the *Patella* is bound againſt the Articulation, by the very ſtrong Tendons of the Muſcles which extend the Leg. Nor is it eaſy for the Bones of the Leg to be wholly diſplaced from that of the Thigh, ſo as to make a perfect Luxation; by reaſon of the great Strength of the Ligaments, and the two deep *Sinuſes* which receive the Head of the Thigh-bone: Unleſs thoſe very ſtrong Ligaments ſhould happen to be broke inſunder at the ſame time. And this ſeems to me to be the Reaſon why People, who ſuffer a perfect Luxation of the Knee, are generally tortured with ſuch violent Pains and Convulſions, that they are wholly ſpent or waſted thereby: Or, if they ſhould eſcape that, they are generally troubled with Lameneſs and Stiffneſs in the Joint. But on the contrary, the ſlighter the Luxation, or the nearer it approaches to an Imperfect or Subluxation, the more eaſy it is generally to effect the Reduction and Cure. Yet I myſelf reduced, ſome Years ſince, at *Helmſtadt*, a perfect Luxation of the *Tibia* backwards, and that in a robuſt and jolly Patient, without any other Inconvenience, than his perceiving a Tumor and ſome Pain in his Knee for a few Weeks: Which were afterwards entirely removed by emollient Fomentations and Cataplaſms; and his Leg is perfectly ſound to this Day. Luxation of the Knee.

IV. For the reſt, as this kind of Luxation is very eaſy to diſcover from the thin covering of the Joint, with the Tumors and Cavities which follow; ſo, when it is diſcovered, it is as difficult to make a perfect Cure thereof, without letting the Bones join together; or leaving ſome Stiffneſs in the Knee; which firſt Accident is uſually called an *Anchyloſis*. For it is ſcarce poſſible, that this Caſe ſhould happen without greatly lacerating or contuſing the Ligaments and Glandules which belong to this Articulation, ſo that their nutritious and mucilaginous Juice being inſpiſſated in the Articulation, prevents the natural Motion of the Joint.

V. When the Knee is but ſlightly luxated, the Patient is to be ſeated on a Bed, Bench, or Table, and one Aſſiſtant holds the Thigh firm above the Knee, and the other extends the Leg; but the Surgeon in the mean time replaces the Bones by his Hands and Slings, if neceſſary, (as in the Reduction of the Arm, *Plate* X. *N.* III.) or puſhes it by the Application of his Knee into its natural Place. If the Hands and Slings be not ſufficient for this Purpoſe, it will be neceſſary to make uſe of the Inſtruments before deſcribed in *Book* II. *Chap.* I. *N.* XXI. as the Girt of Hildanus, and the *Polyſpaſton* or Pulley, *Tab.* VIII. *Fig.* 15 and 17. But we muſt be very careful here, not to make the Extenſion ſo violent in Children and young People as to ſeparate the *Epiphyſes* from the Bones to which they are not yet firmly united: For by that means a worſe Diſorder and Lameneſs will be brought on. After the Luxation of the Knee is rightly reduced, it is to be properly bound up, and placed in a Straw Caſe; and the reſt muſt be managed as we have before directed concerning the *Patella*, *N.* II. How it is to be replaced.

VI. Some-

Luxation of the *Fibula*.

VI. Sometimes the *Fibula* is ſeparated by ſome external Violence from the Thigh-bone, and is then diſtorted either upward or downward: And this generally happens, when the Foot has been luxated outward. Therefore whenever this is the Caſe, there is need of Extenſion: The Bone is to be firſt reſtored to its natural Place, and then properly bound up, the reſt of the Cure being to be carried on as we directed at *N.* IV and II. 'till it be grown firm again to the *Tibia* and Leg. Laſtly, Patients ſhould be frequently cautioned not to uſe or bear any Streſs upon the diſordered Leg too ſoon; unleſs they would throw themſelves into a worſe Diſorder, an incurable Lameneſs.

CHAP. XII.

Of a LUXATION *of the* FOOT *and* ANCLE.

Luxation of the Ancle.

I. THE Ancle may be ſometimes luxated either in Jumping, Running, or Walking, and that in all four Directions, inward, outward, backward, and forward. Which of theſe Ways it happens to be luxated, may be diſcovered by the particular Poſture of the Joint: For when it is luxated internally, the Bottom of the Foot is turned outward; and on the contrary, when it is luxated outward, the Bottom of the Foot is turned inward: Which latter Caſe happens much more frequently than the other. If it ſhould be diſlocated forward, the Heel becomes ſhorter, and the Foot longer than it ſhould be: If backward, the contrary Signs will appear. Laſtly, the Ancle can ſcarce poſſibly be luxated outward, unleſs the *Fibula* be ſeparated from the *Tibia*, or elſe quite broke, which may happen on the external Ancle. An Example whereof may be ſeen in LE DRAN, *Obſ.* 109.

Luxation of the Ancle dangerous.

II. Nor is it uncommon for a Luxation of the Ancle to be attended with the moſt grievous Symptoms, eſpecially when occaſioned by ſome very great external Violence. For it is ſcarce poſſible for it to happen otherwiſe in this Caſe, ſince the Diſtortion of the Foot muſt overſtrain the adjacent Ligaments, Tendons, and Nerves, and thence excite moſt violent Pains: Or the Veins and Arteries may be alſo lacerated; by which means there will be a large Extravaſation of Blood about the whole Foot, which often gives riſe to a Gangrene. Of this Accident DIONIS give an Example in his Book of *Surgery*. Nay, ſometimes Death has enſued from this Kind of Luxation, as TULPIUS has remarked, in *Obſ. Med. Lib.* IV. *Obſ.* 50. Who alſo quotes HIPPOCRATES on that Subject, *Lib. de Art.* XII. *Hiſt.* 48. & *Lib.* V. *Epid.*

The Ancle is ſometimes only contuſed.

III. But it ſeems to be here worth notice, that the Ancle is not always luxated after it has been violently ſtrained by leaping, or turning the Foot on one Side. For it ſometimes happens in thoſe Caſes, that the Ancle is not diſlocated, but retains its proper Place, only the Parts are violently contuſed and ſtrained: In which Caſe the Patient may happen to be afflicted with the moſt ſharp Pains, great livid Tumor and Stiffneſs, ſo that he can neither ſtand nor walk, but is obliged to keep his Bed for a long Time. Hence, to attempt an Extenſion and Reduction in this Caſe, would be altogether uſeleſs and improper.

IV. The Ancle is more or leſs difficult to reduce in Proportion to the Violence of the Cauſe by which it is luxated. It is a general Obſervation, that Oppoſites are uſually the Conſequences of Oppoſites. But the moſt ready way of reducing a Luxation of the Ancle is to place the Patient upon a Bed, Seat, or Table, letting the Leg and Foot be extended in oppoſite Directions by two Aſſiſtants, while the Surgeon ſtrives to reduce the Ancle with his Hands and Fingers. When the Foot is by this Means once replaced, it is proper to bind it up carefully, after it has been well bathed with *Oxycrate* and Salt, adviſing the Patient to keep to his Bed a good while, 'till the Diſorder and its Symptoms quite leave him, and he finds his Ancle to have recovered its Strength ſo far as to ſuſtain the Weight of his Body without any Uneaſineſs or Danger. How the Ancle is to be reduced.

V. But in a Contuſion or great Strain of the Ancle, it will be not improper to plunge it ſuddenly into cold Water, and to repeat it for ſeveral Days. If any ſhould not care to undergo the Action of the cold Water, I would perſuade him to apply Compreſſes dipped in *Oxycrate* which has had Salt diſſolved in it, binding them on and renewing them often upon the diſordered Part. DIONIS runs directly into this Method of Cure. He applies what the Surgeons call a Defenſative, made of the White of an Egg and Oil of Roſes, and Allom, beat up together, which being ſpread on Linen, he binds firmly upon the Ancles, repeating it frequently. In about three Days after, he makes a Decoction of aromatic and aſtringent Medicines, as Roſes, Wormwood, Roſemary, Granate Peels, and Allom, in Wine; and with this foments the Ancle well, and applies Compreſſes dipped therein, binding them on tighter than before. This continued about a Fortnight, he then applies ſome ſtrengthening Plaſter, 'till the Pain and Weakneſs vaniſh, How a Contuſion of the Ancle is to be treated.

VI. So ſtubborn and unmoveable are violent Strains of the Ancles in ſome People, that they will give way neither to the Skill of the Phyſician, nor Virtue of Medicines, but are only to be removed by Length of Time. Inſtances are not wanting, where the Foot has been ſo greatly diſordered, a Year after the Luxation, that the Patient could not walk in a way the leaſt uneven, nor go up and down Stairs without great Trouble. To remedy this Diſorder, the ſame is to be carefully obſerved here, which we obſerved before at *N.* IV. The Bandages which are proper here, we ſhall deſcribe hereafter. A Contuſion of the Ancle ſometimes difficult to cure.

VII. Sometimes it happens, that only the *Os Calcis* or *Calcaneum* is luxated by ſome external Force, and that either towards the internal or external Side of the Foot. Which ever way it happens, when there is Pain and Inequality of the Member, that is, when it has a Cavity in one Part, and a Tumor in another, there is ſtrong Reaſon to ſuppoſe a Luxation. And as ſoon as it is diſcovered, the ſame Method of Cure is required with that before recited, keeping the Limb quiet for ſome time afterwards. Luxation of the *Calcaneum.*

VIII Laſtly, If any other Bone in the Foot, the *Tarſus* or *Metatarſus*, ſhould happen to be luxated by ſome conſiderable external Violence, the Ligaments with the adjacent Nerves and Tendons are generally ſo affected as to excite not only moſt acute Pains, but violent Inflammations and Convulſions: And even Death itſelf has been obſerved by ſome Phyſicians to be the Conſequence, unleſs the Bones were ſpeedily replaced. It is therefore the ſafeſt Way to reduce the Luxations in theſe Bones of the Foot, by the Method we before Luxations of the other Bones of the Foot.

propoſed:

propoſed for thoſe of the Hands, and that with the greateſt Expedition. So when any of the Bones in the Toes are diſlocated, there is nothing more required than what we propoſed before in thoſe of the Fingers. We are however, in the laſt Place, to recommend the Patient to reſt quietly in his Bed for a ſufficient Time afterwards.

An EXPLANATION *of the* TENTH TABLE.

Tab. X. *Fig.* 1. Is a Sling which may be uſed to make an Extenſion in Luxations of the Head. See the Chapter on Luxations of the Head.

Fig. 2. Is another Sling, to retain the Patient's Body firm in the ſame Caſe.

Fig. 3. Shews the moſt commodious Method of reducing a recent Luxation of the *Humerus*.

A, Is the *Patient*, ſeated ready to undergo the Operation.

B, Is the *Aſſiſtant*, that holds the *Patient* firm in his Seat.

C, Is the *Aſſiſtant*, that extends the diſlocated *Humerus*.

D, The *Surgeon*, reducing the diſlocated *Humerus*.

E, A Napkin, whereby the Surgeon elevates the Arm, in order to its Reduction.

Fig. 4. Is a Machine, commonly called the *Ambe* of HIPPOCRATES, uſed formerly to reduce Luxations of the *Humerus:* It conſiſts of the *Fulcrum* AA, to which is faſtened the moveable Leaver B C, joined to each other by a ſort of moveable Articulation D.

Fig. 5. Shews how the former Inſtrument is to be applied to a Luxation of the *Humerus*. There is ſome Difference between the Structure of this and the former, at the Joint C D: Some think this is preferable to the laſt.

AA, Is the *Fulcrum*; B C, the Lever, to which the luxated Arm is faſtened by the three Ligatures E E E. D, the Place where the *Fulcrum* and Lever are faſtened together by a moveable Joint. When the End of the Lever B is preſſed downwards, the luxated Arm is extended, and lifted up near its *Scapula* E.

Fig. 6. Is PETIT's *Machine* for reducing Luxations of the *Humerus*, and ſeveral others.

a a, Are two Arms or Horns, by which the Patient, and particularly his *Scapula* is held firm, from giving way in the Extenſion; B, the other End of it, reſting upon the Ground or Floor. C C, are the Pullies of the Machine: *d d*, the Rope, by winding up which, an Extenſion is made. E, is the Handle, which being turned round, draws the Rope tight, and extends the Limb. F F, the Place where the two Horns are joined to the Body of the Machine.

Fig. 7. Is a *Retinaculum*, or Supporter, to be uſed in a Luxation of the *Humerus*. A, is an Opening or Slit in the Machine. B C, the Form of it at each End. D D, two Apertures, through which the two Legs or Horns *a a* of the Inſtrument *Fig.* 6. are to be paſſed.

Fig. 8. Is a particular Sling of Mr. PETIT's, proper for extending luxated Limbs. AA, the Part made with Leather; *b b b*, a Silk Ligature, ſewed to the Leathet in three Places at 1, 2, 3. The Part AA is faſtened round the Arm;

Fig: 1.

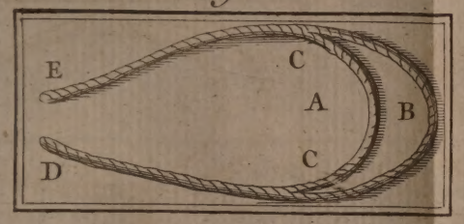


Fig: 2.

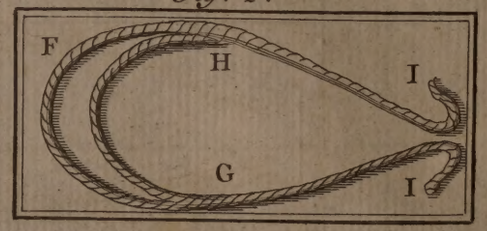


Fig: 9.

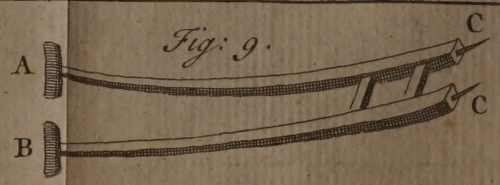


Fig: 6.

Fig: 3.

Fig: 5.

Fig: 4.

Fig: 8.

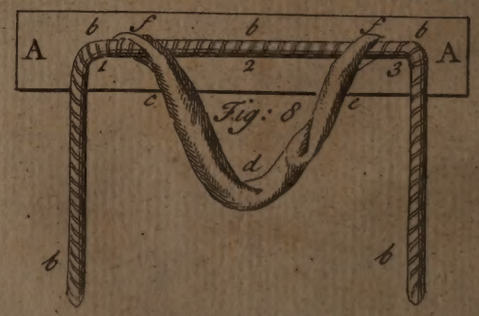
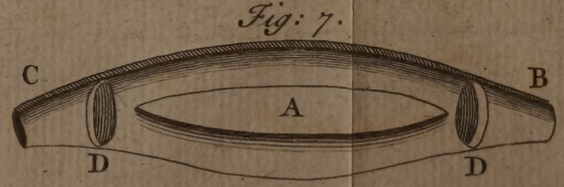
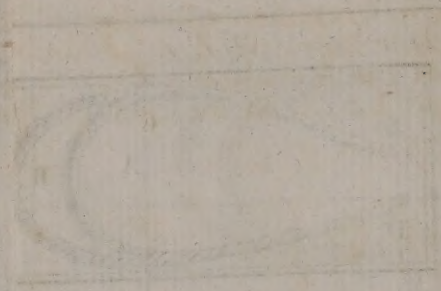


Fig: 7.





Arm; *cde*, is a ſtrong Loop faſtened to the Silk Ligature at *f f* ſo as to be moveable.

Fig. 9. Is another Kind of Supporter to be uſed in reducing the Femur, when luxated outwards: It differs from that repreſented at *Fig.* 7. being without the Aperture A in the Middle. B and C are the two Cavities, by which the Arms are fixed to the Machine.

Fig. 10. Is an Inſtrument recommended by Petit for the Reduction of the *Femur* when diſlocated inwards. It is to be faſtened at F F in the Machine *Fig.* 6. inſtead of the two Arms *a a*. The Part A is applied to the *Os Ileum*, and the Part B to the Middle of the Thigh: But C C are fixed into the Machine *Fig.* 6. at F F.

INSTITUTIONS OF SURGERY.

PART I. BOOK IV.

Of TUMORS.

CHAP. I.

Of TUMORS *in general.*

A Tumor what,

I. ANY Part of the Body which is preternally enlarged, is, by Phyſicians, called a *Tumor*. But whether there be any ſuch Enlargement, in what Part its exiſts, and of what Kind it is, may be diſcovered by examining the Parts, not only by Inſpection, but more particularly by Feeling. And notwithſtanding it has been the general Cuſtom to refer *Excreſcences*, as Warts, Corns, and ſuch as grow in the Noſe and *Pudenda*, to the Claſs of *Tumors*; yet becauſe they grow not from beneath, but out of or upon the Skin itſelf, it ſeemed proper here to treat ſeparately of Tumors, properly ſo called. We ſhall take Notice of the moſt remarkable Excreſcences, when we treat of Chirurgical Operations.

Kinds of Tumors.

II. There are Tumors of various Kinds, diſtinguiſhed by particular Names, according to the different Cauſes from whence they proceed, and the particular Parts wherein they are ſeated. Some are called *hot*, others *cold* and *watery*; ſome again are termed *windy*, other *ſchirrous:* And laſtly, the Phyſicians call ſome *benign*, other *malignant*. There are ſome Tumors which are contained in a proper membranous Bag, and are therefore called *cyſtic:* And if this ſhould be in an Artery, 'tis uſually termed an *Aneuriſm*; but when in a Vein, a *Varix*. In the Veins of the *Anus* or *Rectum*, the Diſorder is termed *Hæmorrhoides:* But if the Tumor be in the *Scrotum*, *Inguen*, or at the *Umbilicus*, it is generally called a *Hernia*. If any *Pus* or Matter is contained in the Tumor, it is then by the Surgeons termed an *Abſceſs*. Laſtly, if the Tumor is ſeated on a Bone, Phyſicians uſually call it an *Exoſtoſis*.

Kinds of Inflammation.

III. The forementioned Claſſes of Tumors are all of them generally ſubdivided into ſeveral other Kinds. Thus the hot and burning Tumors, which are the ſame with Inflammations, are generally termed *Phlegmons*, when violent, and ſeated in the common Integuments; but when ſlighter, they are commonly called

called *Furuncles*. The Inflammation which is not fixed deep, but ſpreads only ſuperficially upon the Skin, is uſually diſtinguiſhed by the Name of an *Eryſipelas*; and the inflammatory Tumor that ariſes at the Fingers Ends is termed *Paronychia*. When the Inflammation fixes in the Groins or Arm-pits, the Tumor is called a *Bubo*; but when under the Ears, *Parotis*. If a great Inflammation ſeizes the Hands and Feet from extreme Cold, *Childblains* ariſe. Other Inflammations have alſo particular Names, according to the particular Part of the Body they poſſeſs. Hence, in the Writings of Phyſicians, we frequently find Accounts of an Inflammation of the Breaſts, Eyes, Tonſils, Teſticles, Arms, Feet, *&c.* And this may ſuffice for a ſhort and general Account of the Kinds of Inflammations: The various other Sorts of Tumors we ſhall explain hereafter.

IV. Before we proceed farther into the Conſideration and Treatment of Tumors, it will be firſt proper to take notice, that we do not intend here to handle all Sorts of Tumors to which the Human Body is ſubject, but only ſuch as are external, and of the ſlighter Kind. We intend firſt to examine thoſe Tumors only which are to be cured by manual Operation, and topical Remedies, and ſo come properly under the Buſineſs of Surgery: Neglecting at the ſame time ſuch Tumors whoſe Cure is to be expected chiefly from the uſe of internal Medicines; as is uſual in ſome internal Inflammations, *Scirrus's*, Dropſies, and the like. We ſhall alſo refer thoſe Tumors which require Inſtruments and great Skill in their Treatment, to the Part of Chirurgical Operations: Such are *Herniæ*, *Eceſcences*, *Strumæ*, *Scrophulæ*, the *Paronychia*, *Cyſtic Tumors*, *Aneuriſms*, *Varices*, *Hæmorrhoides*, and others. Our chief Concern here will be to treat of *Inflammations*, *Schirrus*, *Cancer*, *Œdema*, *Tumors of the Joints*, and other external Tumors. We begin with Inflammations.

CHAP. II.

Of a PHLEGMON

I. A *Phlegmon* or external Inflammation is, when any outward Part of the Body is preternaturally enlarged, and attended with a Burning Heat, Pain, Redneſs, Reſiſtance, and a continual Pulſation and Pricking. Upon a due Conſideration whereof, we may pretty readily perceive the Reaſon why the Diſorder came to be diſtinguiſhed by this Name. If we enquire into the proximate Cauſe of this Inflammation, we ſhall find it generally riſes from too thick or viſcid a State of the Blood, ſtagnating in the *Anaſtomoſes* of the ſmalleſt Arteries and Veins: So that the Blood being ſent in larger Quantities than it can paſs through thoſe Veſſels, muſt of conſequence excite the forementioned Symptoms, and muſt occaſion great Diſorder at every Part where ſuch Stagnation is made. And though no Part of the Body, whether external or internal, nor the Bones themſelves are exempt from this Kind of Inflammation; yet it more frequently happens in the Fat and Glands than elſewhere. What a *Phlegmon* is.

II. We juſt now obſerved, that the immediate Cauſe of this Inflammation was an Obſtruction or Stagnation of the Blood in the ſmalleſt Order of Veſſels. But if we enquire into the Cauſes from whence that Inſpiſſation and Stagnation Cauſes (1.) external.

of the Blood in thoſe Veſſels proceeds, we ſhall, upon Examination, find them to be of two Kinds: Of which, the firſt Sort may be called external, and the latter internal. Amongſt the *external Cauſes*, we place in the firſt Rank, all Wounds, Fractures, Luxations, Contuſions, Punctures by Thorns and Splinters, with a too great Compreſſion of the Veſſels, whether by too ſtrict a Bandage, or otherwiſe: Each of which obſtruct the Paſſage of the Blood through its minute Veſſels, by either dividing, bruiſing, compreſſing, or diſtorting them. To the forementioned Cauſes we muſt add Burns of all Sorts, extreme Cold, too violent Motion of the Body, the external or internal Application of ſharp and ſtimulating Subſtances, ſticking Plaſters, oily and fat Things, with Abundance of the like Nature, which ſtop up the inviſible Pores of the Skin, and impede the free Courſe of the Blood.

(2) Internal. III. Amongſt the *internal* Cauſes, we reckon any thing acrimonious in the Fluids, as in the Scurvy: Becauſe theſe ſo irritate, corrode, prick, and contract the very ſmall Veins and Arteries, that the Blood is thence by degrees obſtructed in them. But the ſame alſo frequently happens from the Blood abounding in too *great Quantities*, or being of *too thick a Conſiſtence*; or laſtly, when it circulates in the Body with *too violent a Motion*. For by this Means the groſſer Particles of the Blood are drove, and, as it were, wedged into much ſmaller Veſſels than they can readily find a Paſſage through; and this more eſpecially when a ſudden Cold is ſpread over a Body that is in a great Heat. In ſhort, every thing will produce an Obſtruction, which makes the Parts of the Blood too groſs and bulky, or too much contracts the Mouths of the ſmall Veſſels.

What Share an Acid and Fermentation, have, as Cauſes. IV. As this is the State of the Caſe, with regard to the Cauſes of Inflammation, I think the Opinion of ſome modern Surgeons, who ſuppoſe the chief and ſole Cauſe of the Obſtruction to be an *Acid* in the ſmall Veſſels, appears to be very evidently erroneous. For beſides their Inability to diſcover whether and where this Acid hides itſelf, it is very apparent from what we have here delivered, that great Obſtructions may be brought on by a long train of very different Cauſes. The ſame may be ſaid with regard to *Fermentation*, which has been formerly patroniſed by many as a grand Cauſe in Inflammations and Obſtructions: For there could never yet be found any ſuch Fermentation in the Blood.

The Symptoms of Inflammations. V. We obſerved at § I. that an Inflammation was generally attended with Tumor, Heat, Redneſs, and Pain, and very often with a Reſiſtance and conſtant Pulſation. To inveſtigate the Cauſes of which Symptoms, we ſhall meet with no great Difficulty, if we ſtrictly and accurately examine the Diſorder itſelf. When the Blood is obſtructed in its Paſſage through ſome of its ſmalleſt Veſſels, it muſt neceſſarily move faſter through the reſt; for the ſmalleſt Arteries are never all obſtructed, but in a *Sphacelus*. The general Conſequence then muſt be, a ſwifter Circulation of the Blood through all its other pervious Veſſels in the Body: Hence the Arteries muſt beat quicker, ſwell larger, and thence excite great Heat. When we find a Patient in this State, we ſay he has a ſmall Fever; which is uſually accompanied, for the firſt Days, with Thirſt, Head-ach, Reſtleſſneſs, and the other common Attendants of a Fever. If we bleed the Patient in this Caſe, when his Blood is cold, it appears covered with a tough, and whitiſh Cruſt or Skin, not greatly unlike the Skin of freſh Pork. As the Diſeaſe and Heat increaſe, each of theſe Symptoms become more violent: 'Till at laſt, the

the whole Mass of Blood being deprived of its most fluid Parts, is converted into a tough and glutinous Body, as will be more apparent from our Observations at the Operation of Bleeding.

VI. Inflammations terminate variously according to their different Degrees of Violence, the Causes from whence they arise, the Parts which they affect, and the particular Constitution of the Patient, with several other Circumstances, which also presage to us what will be the End of the Inflammation. But the several Ways wherein an Inflammation terminates, are chiefly four. It is either (1.) so *dispersed* and *resolved* as to vanish without leaving any considerable Injury in the Part affected, which afterwards recovers its former Vigour, and is of all the best Course it can take. Or else (2.) the Inflammation suppurates and degenerates into an *Abscess*, so as to leave ever after some Damage in the Organ. Or else (3.) the Inflammation degenerates into a *Gangrene* or *Sphacelus*. Or (4.) lastly, into a very hard Tumor, commonly called a *Schirrus*, which grows more compact in the Part affected as the Inflammation remits or goes off. The several Ways by which an Inflammation terminates.

VII. As to the Resolution or *Dispersion* of an Inflammation, that is usually practicable when it is only of a milder Kind, in a sound Habit of Body, when the Blood is not yet too viscid nor vehement in its Motion. But *Suppuration* follows, when the Inflammation is more violent, the Circulation more rapid, but yet the Mass of Blood somewhat temperate, and without much Acrimony: That is, when the Blood becomes somewhat more inspissated, and its larger Particles sticking in the minute Vessels, can find no Passage; by which means the very small Vessels are distended and burst by the Pressure and Impulse of the obstructed Blood, so that their Contents are extravasated in the Fat, Flesh, and adjacent Parts. Upon this Extravasation the more subtile Parts of the Fluids putrify by the great Heat, they become fœtid, acrimonious, and corrode all around them. The Fluids thus changed and corrupted, are then by the Surgeons called *Pus* or Matter: Of which there are several Kinds, according to its different Colour and Consistence; being either white, yellow, greenish, reddish, or party-coloured. How it may be (1.) dispersed, or (2.) suppurated.

VIII. The Inflammation generally terminates in a *Gangrene* (which CELSUS and the *Latins* term *Cancrum*) when the forementioned Symptoms are much more violent, and when the Blood is at the same time more acrimonious and rapid than it ought to be. For, in that Case the small Arteries and Veins are corroded, and burst or broke: Hence all the adjacent Parts are dissolved and corrupted by the acrimonious and extravasated Humours; and particularly the Skin is very subject to be filled with Pustules, when its *Cuticle* has been separated, as in Burns. The *Sanies* contained in these Pustules and elsewhere, is usually termed *Ichor*; which is generally of a pale reddish Cast, being sometimes flesh-coloured, and sometimes brown or livid, which is the worst of all. For unless the Patient in these Circumstances be timely assisted, the forementioned Symptoms of Inflammation go off, the Tumor, Resistance, Heat, Redness, Pain, and Pulsation gradually disappear, and the afflicted Member grows flaccid and cold: It afterwards turns pale, becomes dead and insensible, and the Inflammation creeps to some other Part. If this Case should chance to be treated with Medicines too hot, astringent, cooling, fat, acrimonious, or narcotic; or if the Parts should be bound up too tight, the Flesh then quite dies, its Paleness turns to a livid or leaden Colour, sometimes resembling the Rind of Bacon. In the mean time the inclosed *Sanies* finds no Vent, becomes more acrimonious, and Or end in (3.) *Gangrene*, or (4.) *Schirrus*.

so

ſo greatly corrodes the adjacent fleſhy Parts, as wholly to deſtroy all Senſe and Motion throughout the Limb; whereupon follow a *Sphacelus*, or entire Corruption of the Member. But if the inflamed Part be full of Glands, and the Blood very thick, glutinous, and inſpiſſated; the ſmall Blood-veſſels are then ſo ſtrongly ſtuffed up with the glutinous Blood, that they are compacted together, the Parts loſe their Senſation, and are converted into a *hard* Tumor, which is thence called a *Schirrus*. This may be ſufficient concerning the four ſeveral Ways wherein a *Phlegmon* may terminate: But it remains that we ſhew the particular Method of Treatment and Cure proper in each of thoſe Stages.

Of the Reſolution or Diſperſion of INFLAMMATIONS.

In what a Diſperſion thereof conſiſts.

IX. Though the Methods uſed to cure Inflammations may be various, according to the ſeveral Cauſes and ſupervening Symptoms, with other various Circumſtances: Yet, as the Inflammation conſtantly ariſes from an Inſpiſſation of the Blood in its ſmalleſt Veſſels, the grand Intention of each of thoſe Methods ſhould be, to open ſuch ſmall Veſſels as are obſtructed, and to reſtore the Blood to its natural Conſiſtence and free Circulation. This has been commonly termed Reſolution or Diſperſion. Therefore, whenever the inflammatory Signs, mentioned § V. are gentle, it is much the beſt Way ſpeedily to conclude about diſperſing it: The right Method of performing which, we are now going to lay down.

Removal of the external Cauſes.

X. If the Cauſe of the Inflammation is found to be external and obvious to the Senſes, as Thorns, Splinters, the End of a Sword, Bullets, or any other foreign Body ſtuck in the Part; nothing can be more ſerviceable than to ſpeedily and carefully remove whatever is lodged there, if it can be done with Safety. So alſo when the Inflammation proceeds from a too ſtrict Bandage in Wounds, *&c.* or from a Luxation or Fracture; the firſt and principal Buſineſs is, to ſpeedily relax the Bandage, or elſe to ſet the Fracture, or reduce the Luxation.

Treatment of a ſlight Inflammation.

XI. When the external Cauſes are once removed, the next Thing to be conſidered is, whether the Inflammation be mild, or violent. If mild, there is no occaſion for Bleeding, or ſtrong Purges: The End is generally anſwered, by applying Compreſſes, dipped in Spirit of Wine, with a little *Sal Ammoniac*, or Lime-water, and ſome Spirit of Wine camphorated, to the inflamed Part, and repeating them warm at proper Diſtances. Likewiſe Oxycrate, or Cabbage-pickle, or a Decoction of Wormwood, Southernwood, *&c.* in Wine or Sea-water, applied in the ſame manner, are of wonderful Efficacy in removing ſlight Inflammations.

Bleeding and Purging to be uſed.

XII. But where the Inflammation is violent, it is very uſeful to open a Vein, either in the Arm or Foot, and to draw off a large Quantity of Blood, proportionable to the Strength and Habit of the Patient; giving afterwards a briſk Purge, not one that heats the Body, but judiciouſly accommodated to the Age and Conſtitution of the Patient. Both theſe are very neceſſary here, and if the Symptoms do not remit and grow milder, they muſt be repeated at Diſcretion. But I would adviſe the Surgeon in this Caſe, where he can, to call in the Advice of ſome prudent Phyſician: Becauſe it may be otherwiſe carried on to Exceſs, as many do among the *French*, or elſe not made ſufficient to anſwer the Intention. The moſt proper Purges for theſe Caſes, we have mentioned before (at *Book* I.

Book I. *Chap.* XV. § XIV, *seqq.*) in speaking of Inflammations arising from Contusions. But in very mild Inflammations, or where the Patient is of a weak Habit, or has lost much Blood by a Wound, or any other Cause, Phlebotomy and even Purging itself seems to be quite improper. On the contrary, when the Inflammation is great, and the Patient strong, it is almost incredible of what great Service a prudent Administration of laxative and discutient Medicines may prove.

Internal Medicines proper.

XIII. To resolve and attenuate the inspissated Blood in the small Vessels, exceeding great Benefit will be found by giving internal Medicines, which are watery, diluent, cooling, and attenuating; because Bleeding alone, which the *French* rely too much upon, is frequently insufficient, unless it be joined with a proper Regimen and Diet; by which means any Acrimony in the Blood may be mollified and taken off. But all Aliments which are of a difficult Digestion, such as are pickled or salted, with all Spices and fermented Liquors, or any thing else that may heat the Blood, are to be strenuously and altogether avoided. Such internal Medicines are most proper here to cool and qualify the Blood, as are commonly given with Success in continual ardent Fevers, or internal Inflammations, as the Pleurisy, Measles, *&c.* Such are the absorbent Powders of *Lap. Cancro. Conch. pp.* neutral and nitrous Salts, cooling and diaphoretic Mixtures and Julaps, made of distilled Waters, subacid Juices and Syrups, also thin Emulsions, made of the four cold Seeds. But the bezoardic and spirituous Tinctures prescribed and recommended by some in this Case, are so far from being serviceable, that they encrease the Inflammation in the Blood, and raise a new Fire.

A regular Diet to be observed.

XIV. With regard to the particular Regimen and Diet, the most proper *Aliment* seems to be Broths and Drinks, made with Barley, Oats, or Flower, also Viper's Grass, Succory, Chervil, Sorrel, Lettice, Endive, Apples, and Vegetables of the like Nature; in the Decoction of which may be mixed the Juice of Citrons or Vinegar, to communicate a grateful Sharpness, and temperate the inflammatory Heat. Hence roasted Apples, or Cherries, and Plumbs boiled, are very wholsome for inflammatory Cases, where they sit easy upon the Stomach. The most proper *Drinks* are such as are thin, watery, and cooling, made of a Ptisan or Decoction of Barley, Oats, or Bread, and to give it a pleasant Taste, Apples may be used, or some acid Syrup. But when the Inflammation is violent, it will be proper to add a small Portion of Nitre[a]. Of these may be drank plentifully in proportion to the Thirst and Heat: But Care should be taken not to let the Patient over-drink himself. Ale and strong Wine should be wholly abstained from: But if they are of the smallest Sort, and the Patient has a strong Desire for them, he may be gratified without any great Danger; especially if a Slice or two of a Citron be infused therein. Besides the foregoing, it may be not amiss, for Variety, to use Coffee and Tea, *&c.* If the Patient should happen to be of a cool and phlegmatic Habit, it may be not improper to add some of the milder Sort of Spices to his Drink, as Cinnamon, Saffafras, Mace, Anniseeds, and the like: Or the Patient may be ordered to infuse some proper medicinal Herbs in the Manner of Tea, or a very weak Decoction of Saffafras; the

[a] HARRIS recommends the following Drink, as of great Service in Inflammations: ℞. *Nitri* ℥j. *Pulv. Coccion. gr.* xii. *Aquæ Simp.* ℔ ij. *Sacch.* ℥j. *m. f. Potio; Cujus bibat Æger.* ℥v. *vel* vi. 3tia *vel* 4ta *quaqua hora.*

drinking

drinking of which will promote a gentle *Diophoreſis* or Perſpiration. For by this means whatever is glutinous in the Blood, will be readily attenuated and reſolved, and the Blood will recover its free Circulation.

External Medicines.

XV. Nor is there leſs Care required in the Application of *external Medicines*. For though ſome Phyſicians uſe nothing but heating Remedies, and others only cooling Medicines, to appeaſe the Inflammation; yet both of them, when applied indiſcriminately, may prove both uſeleſs and pernicious. For one Medicine is not to be applied to every Patient, but particular Remedies are to be ſuited to the Strength and Conſtitutions of particular Patients: Or elſe Injury might follow upon the Application of hot Medicines to hot Conſtitutions, and the contrary. I therefore look upon it to be Matter of Conſequence to obſerve diligently, that cooling Medicines be applied to ſuch as are of a hot Temperature. Among the Coolers, the principal are *Acetum Lithargyriſatum*, applied warm by Linen Rags folded together; or *Acetum calidum minio Bolove permixtum*; or *Oxycratum ex æquis aceti et aquæ portionibus confectum*. Of each of thoſe Liquors may be taken, for Example, ℥vi. *Salis communis* ℥j. *Nitri vel Salis Ammoniaci* ʒij. Let them be mixed, and applied to the affected Limb with Linen Cloths. Among the vulgar, common, or domeſtic Medicines, the *Stercus bubulum recens atque calidum aceto calidiori admixtum*, is an Application very eaſy to be had, and of no ſmall Efficacy: Pickled Cabbage-leaves, Broth, Brine, *&c.* are alſo ſometimes uſed with Succeſs to the inflamed Limb. Some prefer cooling Plaſters, as the *Emp. ad Ambuſta*, *de Minio*, *de Lithargyro*, *Diapompholygos*, *Saturninum*, *&c.* Theſe Plaſters may do pretty well in the ſlighter Inflammations, for ſuch Patients as have a good Opinion of Plaſters; particularly they will do very well in the Night-time, when the Preparation and Application of Fomentations are difficult and troubleſome.

Remedies proper in cold or phlegmatic Habits.

XVI. In cold and phlegmatic Patients, *Sp. Vin rectificat. Sp. Vin. Camph. vel pauxillo Theriac. permiſt.* are very ſucceſsful in diſperſing Inflammations, being often applied by means of hot Cloths: So is alſo the *Aqu. Calcis*, *vel Mera*, *vel cum Sp. Vin. Camph. Aq. Reg. Hungar. Bolo*, *Ceruſſa*, *Lap. Calaminari*, *Sale Ammoniaco*, *aut Lythargyro permixta*. A Mixture of *Sp. Vin.* ℔j. and *Sapon. Venet. vel Hiſpan.* ʒij. being applied warm, gives place to hardly any Medicine for diſperſing an Inflammation. Laſtly, there are many Herbs proper for this Purpoſe, as *Scordium*, *Abſinthium*, *Mentha*, *Sabina*, *Abrotanum*, *Matricaria Flor. Tanaceti*, *&c.* which may be diſcretionally made into a Decoction with *Aq. Salſa*, *Marina*, *vel Calcis*. With this Decoction may be mixed *Sp. Vin. Rect. vel Camph. & Sap. Venet.* by which means its Virtue will be increaſed. The forementioned Herbs may be alſo commodiouſly boiled and made into a Cataplaſm, and applied in the ſame Manner with the reſt of the Medicines, *i. e.* by Linen Cloths folded together, and bound round the diſordered Member.

External Applications how to be made.

XVII. There remains one Thing to be eſpecially obſerved, with regard to the Application of external Medicines in this Caſe: Namely, that each of them muſt be always applied hot, and never be permitted to grow firſt cold. The Inflammation alſo diſperſes generally much more ſpeedily, when the diſordered Limb is firſt rubbed well with a Cloth dipped in ſome warm diſcutient Fomentation, before any freſh Cataplaſm be laid on. And this Method is to be continued, till the Inflammation be either wholly diſperſed, or elſe brought to an End by Suppuration or a Gangrene.

XVIII. In the mean time the Surgeon ſhould carefully obſerve, that the Apartment where the Patient lies be neither too hot nor too cold, but be kept as near as poſſible to the Degree of temperate Air, alſo to reconcile Reſt and Sleep to the Patient, and to let him not be kept awake too long. Laſtly, to let the Patient keep his Mind free from pernicious Paſſions, as Anger, Fear, Care, great Thought, *&c.* What ſort of Life the Patient ſhould lead.

CHAP. III.

Of SUPPURATION *and* ABSCESS.

I. WE obſerved before, that the ſecond Way in which an Inflammation went off, was, by Suppuration; that is, a Converſion of the inſpiſſated Blood, and the ſoft adjacent Parts (as the ſmall Veſſels and Fat) into *Pus*, or Matter: Which Diſorder, when it has not yet found an Opening, is generally called by Surgeons an *Abſceſs*. Suppuration what.

II. An Inflammation may be known to tend to Suppuration from the Signs beforementioned at *Chap.* II. § VII. which generally happens, when the Inflammation has been of long ſtanding when the Surgeon is called in, or when it cannot be diſperſed by the Uſe of the foreeited Remedies. Signs of Suppuration.

III. As ſoon as we find it tend to Suppuration, we muſt wholly lay aſide the Uſe of reſolving Medicines: And we muſt ſtrive, (1.) to forward the Inflammation to Maturity, *i. e.* to convert the ſtagnating Blood into laudable Matter: Then (2.) to procure a Diſcharge or Vent for this ſuppurated Matter. (3.) To let the diſordered Part be well cleanſed from all that is corrupted. And laſtly, (4.) to incarn, agglutinate, and heal the wounded Part. What is to be done in Caſe of Suppuration.

IV. As to forwarding the Inflammation to *Suppuration*, that is to be promoted by particular maturating Remedies. Among which, the beſt ſeem to be ſuch of the Emollients as obſtruct the Pores of the Skin, as Fats, Oils, glutinous and ſlippery Medicines; as alſo the Application of ſharp, pungent, and ſomewhat cauſtic Medicines, made up and uſed in the Form of a Cataplaſm: Or Plaſters of the like Kind may be applied to the diſordered Part. Maturation, how promoted.

V. Among the emollient Medicines for this Purpoſe, there are ſeveral Kinds of Herbs, Fruits, Seeds, and Meals that may be here enumerated: As the *Althæa*, *Malva*, *Lilia*, *Parietar.* *Verbaſc.* *Branca Urſina*, *Solanum*, *Hyoſcyamus*, *Ficus*, *Semen Lini*, *Fœnu-græci*, *ejuſdemque ſeminis Farina*; *Farina item triticea aut ſiliginea*, *Panis primarii & ſecundarii Micæ*, *Vitelli Ovorum*, *Butyrum*, *Mel*, *variorumque animalium pinguedines vel adipes*, *Oleum Lini*, *Olivarum*, *Liliorum alborum*, *Chamæmel.* and many others of the like Kind. As to the other Claſs of Maturaters, which are ſharp, pungent, and ſtimulating, but alſo emollient at the ſame time, there may be reckoned *Chamæmelon*, *Melilotum*, *Cepæ ſub cinere toſtæ*, *Allium*, *Crocus*, *Terebinthina*; *variaque gummata*, *Galbanum inprimis*, *Ammoniacum*, *Bdellium*, *Opopanax*, *Sagapenum*, *in vitellis ovorum reſolutum*; *& denique fermentum panis.* Simple maturative Remedies.

VI. From a proper Mixture of the now recited Simples, may be made various and uſeful Cataplaſms and Plaſters for this Purpoſe. It may be not unacceptable here to inſtance a few of the moſt proper and efficacious of theſe compound Maturatives. Compound Maturatives.

1. ℞ *Herb. Malv. Alth. Parietar. Chamæmel. aa* M j. *Farin. Sem. Lini vel Fænugræci* ℥ ij. *Coq. leni igne aqua vel lacte, ad consist. Cataplasmatis, postea add. Fermenti panis* ℥ ij. *Gum. Galban. in vitell. ovi resoluti* ℥ j. *Dein linimentorum convolutorum adminiculo, calida, & quam sæpissime quidem supra læsum membrum deligantur. Vel,*

2. ℞ *Fol. Malv. Branc. Ursin. aa* M ij. *Caricar. Pinguium contusar.* N° vj. *His eadem, ut modo retulimus, ratione decoctis adde butyri recentis, nec non ceparum sub cineribus tostarum, aa* ℥ ij. *& denique farinæ sem. lini, quantum quidem ad Cataplasma conficiendum sufficit, admiscendum. Vel,*

3. ℞ *Rad. Lilior. alb.* ℥ ij. *Herb. Parietar. Mercurial. Melilot. aa* M j. *Ficuum recent. contus.* N° vj. *Hæc in aqua penitus concoquantur, admixtisque Gumm. Ammoniac. & Sagapen. in vitellis ovorum solutor. ut & aceti boni aa* ℥ j ß. *in Cataplasma quoddam convertantur. Vel,*

4. ℞ *Farinæ Siligineæ, aut Triticeæ M.* ij. *vel* iij. *coq. in s. q. lactis admisc. Gumm. Bdellii & Opopanacis cum vitellis over. subactor. aa* ℥ j. *ut & Croc.* ℥ j. *in Cataplasma transmutentur. Vel,*

5. ℞ *Fermenti panis* ℥ iij. *Mellis* ℥ j. *Saponis Veneti comminuti* ℥ ß. *Olei Lilior. alb. q. s. F. super leni igne Cataplasma. Vel,*

6. ℞ *Mellis* ℥ iv. *ad lentum ignem ex aqua decoquantur; His postea Olei Lini aut Chamæmel pauxillum, ut & Farinæ Siligineæ aut Sem. Lin. quantum ad malagma parandum satis est, admisceatur.*

These Cataplasms, or others of the like Nature, are to be often applied hot to the Part affected, till the Matter within appears to be sufficiently digested or maturated by the Softness and Whiteness of the Tumor. But when the Abscess is of the smaller Kind, it is every way more commodious to apply some maturative Plaster, as *Empl. Diachyl. cum Gumm. vel & Emplastrum ex melle & farina compositum.* These may be applied to the Part affected, till Suppuration ensues.

Internal Medicines proper to be used.

VII. In the mean time, when the Patient's Condition requires it, we must be careful to temperate the Motion of his Blood, not by external Applications only, but also by internal Medicines and a proper Regimen. When the Blood moves too slowly, as may be known by the Pulse, the Patient should moderately use Meat, Drink, and Medicines which are warm and stimulating: By which means the inspissated Blood contained in the small Vessels may be the more easily converted into Matter, by the increased Motion of the Blood. Strong Broths, Wines, and Ale are also very effectual for the same Purpose. But where these are insufficient, and the Pulse indicates that the Motion of the Blood is still slower, it will be proper to order the *Theriaca, Diascordium*, or *Alkermes* to be taken a Bit upon the Point of a Knife several Times in a Day, or dissolved in Wine, Cinnamon Water, or some other Cordial Liquor. In the mean time we must not neglect the *Tinctura Bezoard. Essent. Alexipharm. Diaphoret. Essent. Cinnam.* with other warm cardiac and comfortable Essences, Spirits, and medicated Teas, by infusing a few Sassafras Chips, Red Sanders, Cinnamon, *&c.* But on the contrary, when the Motion of the Blood appears by the Pulse and great Heat to be too violent, then cooling Medicines must be directly ordered, to asswage and temperate the Heat and Motion, and to prevent a Gangrene.

To this Head belong all Sorts of thin and watry Drinks, with ſubacid Medicines and abſorbent Powders with Nitre, as we mentioned in *Chap.* II. § XI. It is alſo ſometimes proper in this Caſe to open a Vein, and bleed a little. Laſtly, when the Strength of the Conſtitution is not impaired, but remains firm, and the Motion of the Blood and Pulſe appear to be neither too ſwift nor too ſlow; unleſs there be ſome urgent Symptom, the Uſe of internal Medicines to promote the Suppuration, ſeems to be wholly unneceſſary, if the Patient keeps up to a proper Regimen.

When the Abſceſs ought to be opened.

VIII. With regard to opening the Abſceſs and diſcharging its Matter, it is a Caution very neceſſary to be obſerved, that the Opening be not made too ſoon, before the Matter has arrived at a perfect Maturity. For elſe, the Diſcharge of the Matter will be not only impeded, but the Part will, in all Probability, be flung into a greater Inflammation. This has indeed been the common and conſtant Practice hitherto; but ſome of the Moderns (among whom is GOULUS a *Frenchman*, p. 259. of his Surgery) will have it proper to open the Tumor directly, without waiting a Suppuration, if it cannot be quickly diſperſed: Which I alſo find to have been the Advice of CELSUS (*p.* 408.) formerly. But to return, an Abſceſs is known to be ſufficiently ripe, when the Tumor, which before reſiſted, feels ſoft and pliant; when it turns pale or of a yellow Colour; when, upon applying the Fingers, you perceive a Fluid to be lodged within; when the Pain, Redneſs, Heat, and Pulſation go off, wholly or in Part, and the Senſation of a Heavineſs or Weight ſeizes the diſordered Part in the room of the former. Yet ſometimes there are Abſceſſes, as I myſelf have more than once experienced, when the Skin does not change its Colour; but on preſſing the Tumor you perceive a Softneſs, and a fluctuating within. In theſe Caſes the other Surgeons and Phyſicians were either doubtful of the Abſceſs, or flatly denied it: Nevertheleſs, when I opened the Tumor, there flowed out immediately a large Quantity of Matter. When the above-mentioned Signs appear, the Abſceſs muſt be opened in the moſt prominent and depending Part without more Delay: For Delay generally proves of a worſe Conſequence than opening it too ſoon, tho' both of them are bad. For when the Matter is retained longer than it ſhould be, in a large Suppuration and nervous Part, there is Danger leſt the corrupted Matter ſhould corrode the adjacent Parts, and produce *Fiſtulæ* or a *Caries* of the Bones; or by inſinuating itſelf into the ſmall Veſſels, and corrupting ſuch Parts of the Blood as it mixes with, it may excite ill-conditioned Fevers; or laſtly, by diſturbing the Functions of the Brain, Lungs, Liver, and Kidneys, it may bring on Inflammations and Suppurations, and at length Death itſelf. Sometimes the moſt ſubtile Part of the Matter perſpires, and only the groſſer Parts are retained behind, which gives Riſe to hard Tumors, eſpecially in glandular Parts. Since theſe muſt therefore be the Conſequences, if the Abſceſs be not timely opened, the Surgeon's great Care muſt be to uſe the proper Opportunity, and to make an Opening by the uſual Methods where the Skin appears to be the thinneſt. The Methods for making this Opening are principally two, either by *Inciſion* with the *Scalpel*, or by making an *Eſchar* with a *Cauſtic*.

How the Inciſion is to be made.

IX. The Parts which are not ſuppurated are to be inciſed in the following Manner. The Surgeon is to graſp the Baſis of the Tumor with one Hand, preſſing the Matter outward towards the Skin, to avoid hurting any Veſſels or

Nerves in the ſubjacent Parts; he is then to make the Inciſion by the ſharp Scalpel (*Tab.* I. A or B) in his right Hand; making the Opening in the ſofteſt and moſt depending Part of the Abſceſs, that the Matter may have the freer *Exit*. When the Abſceſs is large, the Scalpel is not to be taken out as ſoon as the Opening is made, but the Inciſion in the Skin is to be further enlarged with it; but with ſo much Caution as to avoid the larger Veſſels and Nerves, with the Muſcles of the ſubjacent Parts. The Abſceſs thus opened, the Putrid Matter is to be let out; and when it is glutinous and thick, it may be gently preſſed forth with the Hands. But if the Quantity of Matter contained be very large, and the Patient not bold enough to bear the Knife, but faints away, which is often the Caſe; then the beſt Way ſeems to be, to diſcharge the Matter in Part, and fill up the Cavity with Lint: And after the Patient has been recovered by *Aq. Reg. Hungar.* or ſome other Cordial, to complete the Dreſſing with a Plaſter, Compreſs, and Bandage, leaving the perfect Diſcharge and Cleanſing thereof to the next Dreſſing. But if no *Deliquium* happens, the Matter may be all diſcharged at one Time. The remaining Treatment of this Ulcer is to be the ſame as we have directed before in Wounds. In the firſt Place, the Abſceſs is to be cleanſed with Digeſtives: Afterwards Sarcotic or Balſamic Medicines are to be applied, till the Wound is filled up internally with new Fleſh, and externally cloſed or cicatrized. Tents, particularly of the harder Kind, muſt be here cautiouſly avoided, as they generally produce Ulcers which are very difficult to cure. It is much ſafer to fill up the Cavity with Doſſils of Lint, and to remove them once or twice a Day as there is more or leſs Matter.

How the Matter may be diſcharged by a Cauſtic.

X. The other Method of opening an Abſceſs is, by means of a Cauſtic or corroſive Medicine; and is generally uſed for Children and ſuch as are of a tender Conſtitution, who are very much affrighted at the Approach of the Knife or Scalpel for Inciſion. Among theſe cauſtic or corroſive Medicines, the moſt commendable and proper are, the *Lap. Cauſt. ex cineribus clavellatis & calce viva vel ex lixivio Saponariorum paratus:* Alſo the *Lap. Infernalis*, *Butyrum Antimonii*, and ſuch like, of which there are ſuch Abundance, that almoſt every Apothecary and Surgeon has now his proper Cauſtic, made after his own particular Method, which is ſuppoſed to excel the reſt. The *Lapis Cauſticus* is to be applied to the Abſceſs either whole in the Lump, or elſe beat ſmall, as may beſt ſuit the Occaſion: But then a defenſative Plaſter muſt be firſt applied to the Abſceſs, perforated with an oblong narrow Aperture, much as we have delineated in *Tab.* II. *Fig.* 11. For thus a proper Proviſion is made againſt the ſpreading of the Cauſtic beyond its due Bounds, making its way through the Skin only in a ſmall or narrow Compaſs. Over the Cauſtic is to be applied a Compreſs of Lint or Linen, over the Compreſs a large Plaſter, and over the Plaſter a ſtill larger Compreſs of Linen: And to keep all on firm, a proper Bandage muſt be applied. Things being thus managed, the Patient is to compoſe himſelf to reſt for a while, and the Dreſſing ſhould not be taken off from the Abſceſs for the Space of ſeveral whole Hours. Three Hours is the leaſt, but ſometimes it requires four, five, or ſix Hours to make an Outlet to the Matter by Cauſtics, in Proportion to the Thickneſs of the Skin and Strength of the Medicine. When the Cauſtic is judged to have remained long enough upon the Abſceſs, the Dreſſing muſt be then taken off, that the noxious Matter may be diſcharged: But

if

if the Cauſtic has not ſufficiently penetrated, the Opening may be forwarded and enlarged by gently applying the Scalpel, Probe, or Spatula, that all the Matter may have a free Paſſage. But as ſoon as the Cauſtic has made an Eſchar or Cruſt, it muſt be mollified by applying *Butyrum recens*, *Ung. Digeſt. vel Baſilic.* to be retained by a Plaſter and Bandage. When the Eſchar is found looſe or ſeparated, the reſt of the Treatment muſt be the ſame with that we mentioned before, in opening the Abſceſs by Inciſion. But to ſay Truth, without Diſſimulation, I muſt acknowledge it my Opinion and Advice, that the Knife is greatly preferable to the Cauſtic, as being more neat, expeditious, and ſafe, and the Aperture heals with a ſmaller and neater Cicatrix: So that moſt prudent Surgeons do, with Reaſon, always propoſe the Knife before a Cauſtic, uſing the latter only in Caſes of great Timidity, and where the firſt cannot be conveniently admitted.

XI. That our Reader might not be at a Loſs for the Compoſition of the *Lapis Cauſticus*, we thought it would not be amiſs here to lay down a ſhort and approved Method of making the ſame. ℞ *Ciner. Clavellat. & Calc. viv. fortiſſ. aa* ʒvj. *vel. Ciner. Clavellator* ℔j. *Calcis vivæ* ʒvj. Theſe being pulveriſed ſeparately [a], and afterwards mixed together in a large Glaſs, or Earthen Veſſel, are there to be diſſolved in a good deal of Water, letting them ſtand an Hour or two to melt perfectly. Then the Liquor with what it has diſſolved, is to be filtrated through a Linen Cloth from its groſs Sediment, evaporating it afterwards in an Iron Pan over the Fire. The conſiſtent Maſs, left after Evaporation, is to be put in a Crucible, and melted with a ſtrong Fire, ſo that it may flow like Oil. It may then be caſt into a Mortar or broad Pan, and either cut or beat into ſmall Pieces before it is quite cold, which are to be put into a Glaſs very cloſe ſtopped, and preſerved in a dry Place for Uſe. When an Abſceſs is to be opened, a ſufficient Quantity of this is to be taken and applied, either whole or in Powder, and bound upon the Skin, as we obſerved before. If the Cauſtic be wetted, it generally acts a great deal ſooner, ſo as to corrode the ſubjacent Parts, and make an Eſchar in an Hour or two. But when it grows old, by long keeping, it commonly loſes its Force, ſo that at length it cannot corrode at all. Other and no contemptible Method, of preparing this Cauſtic may be ſeen in the Chemiſtry of LEMERY, in the *Leyden* Chemical Collections, and the Surgery of DIONIS, *Edit.* 2. *p.* 709.

The Cauſtic how prepared.

CHAP. IV.

Of TUMOR *and* INFLAMMATION *in the* BREASTS.

I. WE have been hitherto treating of Suppuration. Our next Buſineſs was to have proceeded to a Gangrene: But as there are ſeveral Kinds of Inflammation and Suppuration which do not commonly terminate in a Gangrene, it was proper firſt to treat of theſe ſeparately, before we came to the Conſideration of a Gangrene. We begin with thoſe Inflammations which

What happens in an Inflammation of the Breaſts.

[a] BOERHAAVE, in his *Materia Medica* Sect. 412. takes *Ciner. Clavell.* ʒiv. *Calcis vivæ* ʒvj. and uſes another Method of Preparation, which did not ſucceed with me. You will find a more compendious Preparation of it in the *London* Diſpenſatory: *Ex Calcis vivæ* ℔ ʒ *Cinerum Clavellat.* ℔j.

uſually

uſually afflict the Breaſts, being a Diſorder moſt incident to Child-bearing Women, and almoſt conſtantly happens in a few Days after their Delivery. If the Milk ſhould be impelled into the Breaſt too plentifully and forceably, which at ſuch Times frequently happens, and if the Mother ſhould then be ſeized with great Cold, Fear, or Anger, the ſanguiferous and lactiferous Veſſels being thence obſtructed, the Breaſts muſt then become inevitably tumified, and at the ſame time they will be afflicted with great Heat, Redneſs, Reſiſtance, and violent Pain. The ſame Accident ſometimes happens to Women that give ſuck, even a long Time after their lying-in: Which proceeds from the ſame Cauſes which we juſt now mentioned; and is alſo ſometimes the Caſe of thoſe who have no Milk. I have even obſerved the ſame Caſe in a Man of a weak Habit, which aroſe from a great Fright: One Breaſt was vaſtly tumified, and turned to an Abſceſs, from which, upon the firſt Opening, I extracted above two Pounds of Matter, to the great Surprize of the Patient and the By-ſtanders. This Kind of Inflammation is uſually attended with a Fever or great Heat all over the Body, followed with a quick Pulſe, Thirſt, Head-ach, and difficult Reſpiration: And this in ſuch a Manner, that a Shivering generally proceeds in its Invaſion.

The Cauſes of an Inflammation in the Breaſts.

II. The general Cauſes of Inflammation in the Breaſts of Child-bearing Women, are uſually, as we hinted before, a ſudden Cold taken when the Body is very hot or in a Sweat, cold Drink, Anger, Fear, Grief, and any other violent Perturbation of the Mind, from whence the Blood and Milk may become inſpiſſated and obſtructed in the ſmall Veſſels of the Breaſt. And tho' the Inflammation of the Breaſts happens moſt frequently in Women, eſpecially ſuch as have lately lain in, and either will not ſuckle the Infant or cannot; or when the *Fœtus* died in the Womb, or ſoon after the Birth, in which Caſes it proceeds from the Stagnation of the Milk brought on by Fear and Grief: Yet it may frequently happen from the ſame Cauſes in ſuch as have left off giving ſuck for a conſiderable Time, as alſo from a Blow, Contuſion, or ſome other external Injury of the like Nature.

The Difference of theſe Inflammations.

III. Theſe Inflammations do not always happen to be equally intenſe and violent: For ſometimes it ſeizes the whole Breaſt, ſometimes only one Side, and greatly tumifies it with violent Pain: But then again, at other Times it occupies only a ſmall part of the Breaſt. In one Patient the Inflammation lies very near the Skin; in another ſpreads very deep. At one Time the Inflammation has very urgent Symptoms, as violent Pain, Heat, Redneſs, and Tenſion; but at other Times it ſits very eaſy upon the Part.

Prognoſis.

IV. He that is deſirous to be an able Preſager in the Events of this Kind of Inflammation, ſhould firſt carefully conſider the ſeveral Symptoms of the diſordered Part now mentioned. For as the Tumor is leſs, and the Inflammation and Fever ſlighter, the more gentle and happy is like to be the Conſequences, and the leſs is the Danger. For in that Caſe there is room to hope it may be diſperſed, without coming to Suppuration. But on the contrary, the more violent the Symptoms, the greater is like to be the Suppuration: Sometimes it turns to a *Scirrhus*, and a *Scirrhus* commonly ends in a Cancer of the Breaſts.

Inflammations of the Breaſts, how to be treated.

V. This Diſorder may be very readily prevented in Women of Condition, and ſuch as cannot, or will not, ſuckle their Children, if ſome of the *Emplaſt. de Spermate*

Spermate Ceti ſpread on Linen be applied warm all round upon the Breaſt ſoon after Parturition, being perforated in its Middle to tranſmit the *Papilla* or Nipple; the Acceſſion of the Milk being alſo repelled by a pretty ſtrict Bandage. It may be alſo not improper in this Caſe to hang the *Galactites*, or ſome *Argentum vivum* incloſed in a Nutſhell, about the Patient's Neck, down the Back; and to apply *inter Scapulas Emp. ex Spermate Ranarum, Saccharo Saturno, Oleoque Hyoſcyami permixtum.* Among the internal Medicines, the moſt proper are ſuch as bring down the *Lochia Puerperarum*, when they do not flow in ſufficient Plenty of themſelves. The principal for this Purpoſe are *Eſſent. Myrrhæ, Succin. Eſſent. Croc. Elix. proprietat. &c.* taken now and then in a proper Doſe. Laſtly, with reſpect to the proper Diet, it muſt be carefully obſerved to diminiſh the Quantity of Milk by the Smallneſs and Poverty of the Meat and Drink. Upon which account the Patient ſhould be recommended to drink nothing but ſmall Broth, Tea, or the like watery Liquors, for many Days together, 'till the Afflux of Milk to the Breaſts is found to be ſufficiently weakened. But if the lying-in Mother be deſirous of ſuckling the new born Infant herſelf, there can be no better Preſervative for her againſt Inflammations of the Breaſts, than to keep free from Colds, and to cautiouſly avoid all violent Affections of the Mind, letting the Child ſuck frequently at proper Seaſons to prevent the Milk from Stagnation. Beſides this, Care muſt be taken to uſe Plenty of ſmall Broth and thin Fluids for the firſt Week or two: By which means the Milk will not be ſo abundant, nor apt to be inſpiſſated in the lactiferous Ducts of the Breaſts.

VI. But when Inflammation and Tumor have already fixed themſelves in the Breaſts, the Surgeon's principal Buſineſs is, to uſe all Endeavours to diſcuſs whatever ſtagnates in the ſmall Ducts and Veſſels with the utmoſt Expedition, both by internal as well as external Medicines; in order to prevent the Tumor from running into Suppuration or a *Scirrhus*. For when it ſuppurates, there generally remains an ugly Cicatrix, which is very diſagreeable to moſt Women, but eſpecially the more noble and elegant. As to the internal Medicines proper to be given to Childbed Women, to diſperſe Tumors in the Breaſts, which are generally accompanied with a Fever, I would adviſe the Surgeon and Patient to conſult ſome prudent and ſkilful Phyſician on that head: Leſt the lacteal Fever (as it is generally called) carry off the lying-in Patient under an injudicious Treatment. Cure, (1) by Diſperſion.

VII. As to the external Remedies, in which the Surgeon ought to be particularly ſkilled, the ſtrongeſt diſcutient that I have frequently found to excel others for theſe Tumors, is, the *Emplaſtrum ex Sperm. Ceti præparat.* In the mean time it may be of ſome Service to lay over the Plaſter a diſcutient Bag, made warm and ſtuffed *ex Furfure ac Sale, vel Flore Samb. Chamæmel. Melilot. Lavend. vel ex Sem. Fœmin. Cumin. Aniſ.* &c. There are ſome who put Lambs Skin over the Plaſter inſtead of diſcutient Bags. Which not only defends the Breaſts from external Cold, but is alſo no improper Diſcutient for what ſtagnates in them. But there is ſtill a uſual and very effectual diſcutient Application for theſe Tumors, which is a Calf's Bladder filled with a warm Decoction of *Flor. Samb. & Chamæm.* in Milk, which is to be often applied to the Breaſt, its Warmth being renewed as it is impaired. Of nearly the ſame Virtue is the *Emp. Diachyl. ſimp.* either alone or mixed with *Emp. de Sperma Ceti.* The *Rob. Sambuci* External Reſolvents.

Sambuci or *Theriaca* mixed *cum Sale Abſinthii*, being ſpread upon Linen, and applied in the way of Liniment, prove of great Efficacy in diſperſing theſe Tumors, eſpecially if they are applied warm, and covered with warm diſcutient Bags: But they are hard to be put up with among the rich and very nice Women, becauſe they uſually dawb the Skin, Cloths, and Bedding. To theſe we may add the uſe *Acet. Lithargyr. Acet. cum Semine Carui*, *Aq. Calcis*: Which are of very eaſy and conſiderable Uſe; being applied to the Breaſts by means of Linen Compreſſes dipped in the Liquors while hot, and often repeated. A great many eſteem it a ready and effectual Remedy to expreſs the Milk upon burning Coals; nor do I think it proper to raſhly reject this Method as wholly uſeleſs. For though this Sort of Cure ſeems to be ſympathetical and ſuperſtitious; yet as it may excite a ſtrong Imagination of drying up the Milk in the ſuperſtitious Woman, and that Imagination may have a conſiderable Influence, we ſee no ſufficient Reaſon entirely to condemn it. But if the Breaſts are internally very much diſtended with Milk, it will be proper to diſcharge it by the ſucking either of an Infant, an old Woman, or a Puppy, or elſe by the Application of a Glaſs Inſtrument which we ſhall hereafter deſcribe. The Milk ſhould be thus diſcharged till the Tumor ſubſides and the Pain vaniſhes.

(2.) by Suppuration.

VIII. But when the Inflammation is greater than can be diſperſed in the Space of four or five Days; or when, as it frequently happens, the Surgeon is conſulted too late; the beſt way is to forward it to Suppuration as faſt as poſſible, rather than hazard its turning to a *Scirrhus* or Cancer by Delay. If therefore the noxious Matter be not arrived at a State of Maturity by the uſe of the diſcutient Medicines, in order to accelerate the Suppuration there ought to be a ſpeedy Application of an *Emp. Diachyl. cum Gumm.* or *Emp. de Hyoſcyamo.* But more effectual Cataplaſms are to be alſo made uſe of to digeſt the Matter, ſome of which we mentioned in the preceding Chapter, § 5 and 6. and others we ſhall alſo propoſe here. As,

1. ℞. *Farinæ Siligin.* ℥ ſ ſ *vel* ℥ j. *Melliſque quantum ad Cataplaſma conficiendum ſufficit. Tum lactis & Croci pauxillum admiſceatur, calefactumque in patella quadam lineamentis obducatur, mammiſque ſuperimponatur, ac ſæpius poſtea renovetur. Vel,*
2. ℞. *Farinæ Siligin.* ℥ iv. *Gummi Galbani vitello ovi reſoluti* ℥ j. *Aceti* ℥ iij. *his aquæ tanta portio admiſceatur, quanta Cataplaſmati coquendo ſufficit. Vel,*
3. ℞. *Fermenti Panis* ℥ ij. *Mellis* ℥ ſ ſ. *Saponis Venet. comminuti, & Olei Chamæm. ana* ℥ ij. *quæ ſibi invicem commixta in patellam conjiciantur, atque igni admota in pulticulam ſive malagma convertantur.*

How the Abſceſs is to be opened.

IX. Theſe Cataplaſms are to be applied hot, and very often, to the Breaſts; keeping them on by Linen Compreſſes or Bolſters, the better to retain the Heat, till the Tumor breaks of itſelf, which it often does in this Part, from the thinneſs of the Skin: Or elſe, when ripened, it may be conveniently opened by the Scalpel. But the Inciſion ought always to be made in the lower Part of the Breaſt, unleſs Neceſſity obliges it to be otherwiſe, leſt there ſhould be left a viſible Cicatrix after the Cure. Though there are not wanting ſome Surgeons who uſe the Cauſtic for opening Suppurations of the Breaſt, yet, as they uſually occaſion indecent *Cicatrices*, we think the Knife is greatly preferable to ſuch Medicines.

X. After

X. After the noxious Matter has been discharged from the Breasts, the rest of the Treatment is to be the same with what we proposed in the Cure of other Wounds and Abscesses. The Ulcer is to be first cleansed with some digestive Ointment, and afterwards healed with some Balsam, as the *Peruvian* for Example; with Oil of Eggs and Wax. But when the Suppuration has run very deep, the best way is to inject the Wound with a cleansing Decoction of the *Sanicula* or *Alchimilla* mixed with a little *Mel Rosarum*; and to prevent the Lips of the Wound from closing, before the Bottom is filled up with new Flesh, it will be proper to introduce a soft Tent, or some scraped Lint. As the new Flesh grows up from the Bottom, the Tent may be gradually lessened or made shorter, and, at last, wholly removed when there is little or no Occasion for it. Treatment after the Discharge of Matter.

XI. But it sometimes happens that Tumors in the Breasts of Child-bed and suckling Women will neither yield to Dispersion nor Suppuration, but will retain their ill Condition for the Space of several Months or Years. If this happens in young and healthy People, it occasions little or no Disturbance to the Œconomy: Nor is there great Danger of the Tumor's turning to a *Scirrhus* or Cancer, which the poor female Patient is often vastly afraid of. The Surgeon's Business here is to take Care to keep the afflicted Patient in good Heart by his Persuasions: And to the Tumor itself is to be applied *Emp. de Spermate Ceti cum Pauxillo Camphoræ, vel Diasapon cum Camphorâ*, to be constantly kept on, and the Breast must be carefully defended from the external Cold; by which means Tumors of long standing have grown gradually less, and at last vanished. But the Case is usually otherwise in Women, who are advanced in Years, and of a melancholy or sorrowful Disposition: For in such there is great Danger of the inveterate Tumor turning to a *Scirrhus* or Cancer. What is to be done when the Tumor can be neither dispersed nor suppurated.

CHAP. V.

Of INFLAMMATION *in the* TESTICLES.

I. SOMETIMES an Inflammation and Tumor happens in one or both of the Testicles: Which, if it be any thing violent, generally tortures the miserable Patient with most sharp Pains. Inflammation does sometimes happen in the Testicles.

II. This Disorder may arise from two Causes: Either from some great *external Violence*, as by a Fall, Blow, or Contusion; to which some are liable from mounting a Horse with too much Haste and little Thought: Or from a *venereal* Cause; chiefly when some of the venereal *Virus* inspissates the *Semen*, and obstructs its Course through the small *Tubuli* of this Gland. The Causes of Inflammation in the Testicles.

III. An Inflammation of the Testicle is distinguishable from any other Disorder in these Parts, and particularly from a *Hernia Scroti*, when the Patient has previously suffered any of the Causes § II. and complains of a great Swelling, Heat, Redness and Pain in his Testicle, the same being confirmed to the Surgeon by Inspection: His Feeling will also acquaint him with the Nature of the Disorder: For, upon applying the Hand, one or both of the Testicles are found to be swelled considerably larger than they ought to be, exceeding sometimes the Size of one's Fist. *Diagnosis.*

Prognosis. IV. This Disorder is not of so slight a Consequence as is generally thought; for it very frequently turns out so as to deprive the Man either of his Life or Virility, by degenerating into an Abscess or *Sphacelus:* Or else it turns to a *Scirrhus* or Cancer, which have also Death for their usual Consequence: Or, lastly, it is followed by a *Sarcocele* or *Hydrocele*, which are little less troublesome and fatiguing to the Patient.

Cure by Dispersion. V. The same external Medicines will serve to resolve the Inspissations which happen in an Inflammation of the Testicle, which we before opposed to Inflammations in the Breasts: And above others we prefer *Acet. Lithargyrisat. Aq. Calcis cum Sp. Vin. Camph. cerussa, tutia, Lap. Calamin. permixt. vel & Farin. Fabarum cum Acet. Decoct. in Cataplasma.* But in the Night-time, when the Application of Fomentations is not so convenient, it will be proper to apply *Emp. de Ranis cum duplici Mecurio, vel Emp. Diachylum.* Nor are internal Medicines to be here neglected: For, if the Tumor arose from some external Violence or an Inspissation of the Blood, he should often take of the *Pulv. ex Lap. Cancror. præp. Test. Ostreor. Mat. Perlar. Cinnab. Arcan. duplicat. &c.* together with thin Drinks, as Tea, Decoctions of the Roots, Woods, and discutient Herbs. Plentiful feeding, Things which heat the Blood, and Aliment of difficult Digestion are to be carefully avoided. And if the Inflammation should be of the more violent Kind, it will not be amiss to mix a little Nitre with the forementioned Powder; and to drop some *Sp. Vitriol. Sulphur.* &c. into his Drinks; not neglecting to open a Vein in plethoric Habits.

Treatment when from a Venereal Cause. VI. If the Disorder take its rise from some veneral Taint, it seems necessary to administer good brisk Cathartics, always adding a Quantity of *Merc. Dulc.* to them: At the same time such other Medicines should be used as are calculated particularly against the Venereal Disease itself. Warm Drinks made of Tea, or a Ptisan of Barley, Liquorice and Anise boiled in Water must not be he here neglected. By taking these, the Blood usually becomes temperate and attenuated, and the Tumor frequently dispersed.

How a Suppuration is to be managed. VII. Lastly, if the Surgeon be called in too late, or if the Inflammation prove so violent as not to give way to the preceding Remedies for Dispersion, a Suppuration or Gangrene is generally the Consequence. Therefore the Application of the same maturating Remedies will be here proper, which we proposed in the preceding Chapter for an Inflammation of the Breasts. And when the Matter is sufficiently digested, and the Abscess does not soon break of itself, it will be proper to open it carefully by Incision. The Matter being discharged, the Wound is to be first well cleansed by some digestive Ointment, injecting some strong spirituous Fomentation which resists Putrefaction, and at last healing it with some vulnerary Balsam. But first, to digest the Matter, and mitigate the Pains, it is found extremely serviceable to apply *Emp. de Hyoscyamo, vel Diachyl. cum Gummis*; which are also strongly recommended by LUDOVICUS in his *Chirurgical Works, pag.* 718. While these Applications are properly used, we must strive to extirpate the Venereal Disease itself. And notwithstanding in many of these Cases, the *Scrotum* happens to be consumed so as to leave the Testicle quite bare; yet the Loss of Substance in the *Scrotum* may be generally restored again, by a proper Treatment with digestive and balsamic Remedies, as I myself have frequently seen.

CHAP.

CHAP. VI.

Of an ERYSIPELAS.

I. AN *Eryſipelas* is an Inflammation ſeated in the exterior Part of the Skin and *Membrana Adipoſa* beneath it, which wanders and ſpreads ſometimes to a very great Extent, being accompanied with great Redneſs, Heat, and often Pain. Upon preſſing the Part afflicted with the Finger, it looks white; but upon removing the Finger it turns red again. This Inflammation has been obſerved to fix itſelf oftenest upon the Arms or Legs; but ſometimes it ſeizes the Head, Neck, Shoulders, and Face[a]; often the Noſe, and ſome other Parts. It generally ſeizes the Patient with a *Horror* or Shivering, after which a great Heat ariſes, equal to what is uſually felt in burning Fevers; and hence it has been diſtinguiſhed, as well by the Antients[b] as Moderns, by the Name of *Ignis Sacer*, or *St. Anthony's Fire*. *An Eryſipelas, what it is.*

II. Any Cauſe that can produce other Inflammations may alſo occaſion an *Eryſipelas:* More eſpecially expoſing the Body to ſudden Cold, when it is in a great Heat or Sweat; an obſtructed Perſpiration, the drinking too much fermented and ſpirituous Liquors; a Surfeit, or over-feeding; and laſtly, a hot and ſharp State of the Blood. From all which, either aſunder or together, the Blood may be eaſily inſpiſſated, the ſmall Veſſels contracted, and an Obſtruction, with its conſequent Inflammation, be brought on. *Cauſes of an Eryſipelas.*

III. With regard to the Event of this Diſorder, it is obſerved that there is no great Danger, when the Inflammation is but ſmall and properly treated. On the contrary, when the Inflammation is violent, the Habit of the Body ill and infirm, the Diet and Way of Life irregular, or the Part affected expoſed to cold, neglected, or improperly treated; it is no Wonder if the Inflammation turns to an ardent Fever, an ill-conditioned Exulceration, Gangrene, or *Sphacelus*. But an *Eryſipelas* is more particularly dangerous, when treated with external Applications which are cooling, fat, or oily; and when internal Medicines are taken which heat the Blood, whether Wine, Cordials, Spices, or the like. *Prognoſis.*

IV. In order to cure an *Eryſipelas*, the grand Intention is, to dilute the inſpiſſated Blood, and divide it where it ſtagnates and obſtructs. To effect which, there ſeems to be no better Way than that of giving Plenty of thin watery and warm Drinks, by which, a gentle and laſting Sweat may be excited. For by this means all Viſcidities in the Blood will be diluted, any Acrimony will be temperated, and what heſitates or obſtructs will be reſolved: And laſtly, the uſeleſs and corrupted Part of the Blood will be ejected by the inviſible Pores of the Skin; by which natural Tranſpiration, the *Eryſipelas* will be happily carried off as by an inſtant Remedy. Heating Medicines of all Kinds, eſpecially the *Tinct. Bezoartica Aq. Epidem.* and other ſuch ſtrong, heating, and ſpirituous Medicines, are, in my Opinion, wholly foreign and improper for this Cure; becauſe the Inflammation is generally more increaſed than abated by the *Internal Treatment.*

[a] An Example of an enormous *Eryſipelas* in the Face and Eyelids, which laſted two Months, may be ſeen deſcribed by VERDUC on Bandages, *Chap.* III. and another exulcerated *Eryſipelas* in both the Thighs is obſerved by SCULTETUS, *Obſ.* 92.

[b] CELSUS, *variis in locis.*

Uſe of them. On the contrary, Medicines which are temperating and moderately cooling, are here much more ſafe and uſeful: Particularly Preparations from Elder, as *Rob. Sambuc.* ℥ſs. *vel Cochlear.* j. diluted in *Aq. Flor. Samb.* In the mean time may be uſed Tea, Coffee, or a Diet Drink of Phyſical Herbs. The Patient's Body is to be carefully defended from the external Cold, and to be kept in a gentle and conſtant Sweat. When the Patient is troubled with great Thirſt, he may drink thin Barley Gruel, and for Variety, a little warm Small Beer; for the Main of the Cure generally depends upon moderate Warmth and ſmall Drinks. But if the *Rob. Sambuci* ſhould not be liked by the Patient, ſome Diaphoretic Powder may be given in its room, or together with it, made of the *Teſtacea, Antimon. Diaphoret. cum Nitri portiuncula*, in order to excite a gentle Sweat: But then the warm thin Drinks ſhould not be neglected in the mean time. Laſtly, the Regulation of the Non-naturals proper here, we ſuppoſe to be ſufficiently evident from what we have already ſaid of Inflammations in general, *Ch.* II. *N.* XIII, *&c.*

External Treatment.

V. If the Inflammation in an *Eryſipelas* ſhould be but ſlight, it may then be often cured only by external Warmth: But when violent, external Warmth will not be of itſelf ſufficient, without the Application of Medicines. The diſordered Part is therefore to be covered with *Rob. Sambuci*, ſpread on blue Paper or Linen, over which are to be laid warm Cloths, or diſcutient Bags, as we propoſed before in Inflammations. But the Uſe of the *Rob.* as well as the *Theriaca cum Sale Abſinthii* is ſeldom complied with, becauſe of their Uncleanlineſs, though very effectual in mitigating Inflammations, as we obſerved under Inflammations of the Breaſts. Upon which Account, the Uſe of diſcutient Powders is much more frequent: Among which, the following ſeems to have the Preference compoſed *ex Flor. Samb. Glychyrrhiza contrita, Creta præparata, Ceruſſa item ac Myrrha, aa admixtis cum pauxillo Camphoræ.* This is to be applied to the Part between ſoft blue Papers or Linen Cloths, over which are to be put little warm Bags. To this we may add the *Pulv. contra Eryſipelas Mynſichti*, which is very efficacious, though not much uſed amongſt the Apothecaries. Laſtly, we need not ſay much here of the green internal or middle Bark of Elder, whoſe eminent diſcutient Virtue in Inflammations is almoſt known by every body, and has been this long Time confirmed by conſtant Experience.

A Caution concerning an *Eryſipelas.*

VI. Notwithſtanding there are ſome who judge liquid Medicines wholly improper for the Cure of an *Eryſipelas*; it muſt yet be allowed, that *Sp. Vin. Camph.* uſed warm, either alone, or mixed *cum Croco vel Theriaca* applied warm with coarſe Paper or Linen Rags, are of very great Service here. Nor can I paſs by a Mixture, which I have frequently experienced in this Caſe, *ex Aq. Calc. viv. cum Sp. Vin. Camph.* SCULTETUS (*Obſ.* 94.) greatly extols the following liquid Remedy againſt an œdematous *Eryſipelas*; he aſſerts, that he never found any thing anſwer like it:

℞ *Lixiv. mediocr. ex cinerib. vitis* ℔ j. *Nitri* ʒ j ß. *Salis commun.* ʒ j. *Aceti vini opt.* ʒ j. *M.*

Univerſals being premiſed, this Mixture may be applied to the Part affected by means of double Compreſſes warmed and retained on with Bandage; by which means it has ſurprizingly diſperſed, in three or four Days time, ſuch large

Tumors of this Kind, as have threatened a Gangrene. In the mean time, other liquid Medicines which are over acid, and almoſt all Obſtruents and Aſtringents, together with fat and oily Things, ſhould be cautiouſly avoided. For it can ſcarce be imagined how vaſtly theſe ſtop up the Pores, and by hindering the Blood from throwing off its Feculencies by Tranſpiration, fling the Patient into imminent Danger.

VII. Bleeding and Purging ſeem not to be ſo neceſſary in an *Eryſipelas* as in a *Phlegmon*. For whatever is corrupted of the Juices in an *Eryſipelas*, as it lies near the Skin, ſeems to be much more eaſily diſchargeable by Sweat. But when the Heat is too great, the Pulſe too high, and the Blood too abundant, Bleeding in that Caſe cannot but be judged proper. But to keep the Bowels open, Glyſters ſeem preferable to ſtrong Purges. Bleeding and Purging when to be uſed.

VIII. It here frequently happens that an *Eryſipelas* comes to Suppuration; from whence uſually ariſe the very worſt of untractable and ſpreading Ulcers. When this is the Caſe, the Ulcer is always to be carefully cleanſed, and dreſſed with *Ung. Saturnin. vel de Lithargyro vel de Ceruſſa, una cum Emplaſtro Saturnino*, to temperate the Acrimony of the *Serum*. But it is alſo at the ſame time proper to take ſuch internal Medicines as will temperate and ſweeten the Blood, uſing ſometimes ſuch as diſcharge ſharp Humours by Stool: And laſtly, a ſtrict Regimen of Diet muſt be obſerved, till the Ulcers are healed again, which is even then a very difficult Matter to effect; eſpecially when ſeated in the Legs of old cachectical or valetudinary People. See SCULTETUS on this Head, *Obſ.* 90. An *Eryſipelas* ſometimes comes to Suppuration.

CHAP. VII.

Of a FURUNCLE, *or* BOIL.

I. A BOIL or Furuncle is a ſmall reſiſting Tumor, with Inflammation, Redneſs, and great Pain, ariſing in the *Membrana adipoſa* under the Skin. As there is no Part of the Body free from being the Subject hereof, ſo the whole is ſometimes ſo miſerably infeſted with them, that the Patient can hardly tell how to ſtir himſelf, or on what Part to lie. Not only adults, but alſo the younger, even new born Infants are obnoxious to this dreadful Diſorder, which occaſions in them moſt fatiguing Clamour and Reſtleſſneſs. A Boil, what.

II. The *Signs* proper to a Furuncle we ſuppoſe to have been ſufficiently evident in what we but now propoſed concerning its Nature. And although it be apparent from what has been ſaid, that there is no great Danger in this Diſeaſe, when it happens to adults; yet it ſometimes happens, when they are very numerous in tender Infants, that they excite not only violent Pains, Reſtleſſneſs, and Toſſings, with Weakneſs, Convulſions, and Epilepſies, but at length even Death itſelf follows. Indeed moſt of the bad Symptoms that attend Boils, as in all other Inflammations, are owing to a thick and viſcid Blood. The more glutinous therefore the Patient's Blood is, the more Boils will infeſt him, and thoſe of worſe Conſequence. Signs and Cauſes.

III. With

Cure. III. With regard to the Cure, it seems to consist chiefly in restoring the inspissated and stagnated Blood to its former Circulation and free Motion, and that as soon as possible, by proper Remedies. If the Boils are few in Number, they are seldom treated with internal Medicines, the Means generally used being only external Remedies. But when they are very numerous, or return again, it is necessary to use internal purging Medicines, and such as attenuate and cleanse the Blood. So that in adult Patients it seems proper to bleed both by the Lancet and Scarification, with Cupping: At the same time a strict Regimen of Diet should be used, drinking frequently and plentifully of a Decoction of the Woods, and such like Attenuaters of the Blood: The Patient should also entirely abstain from drinking fermented and spirituous Liquors, particularly Wine and its Spirit, and from the too frequent Use of Tobacco.

External discutient Remedies. IV. When the Disorder is recent, external Medicines only will frequently suffice for the whole Cure, if the Patient observe a strict Regimen. For this Purpose the following Mixture is of great Service, made of Honey acidulated with Spirit of Vitriol, till the Mixture has acquired a considerable Sharpness, which is then to anoint the Furuncles. Of no less Virtue is the frequent touching them with mere *Spirit. Vitriol. aut Sulphuris.* And lastly, discutient Plasters are often found very serviceable here, as *Emp. Diachylum simplex, de Meliloto, de Spermate Ceti, vel Diasaponis.*

How they are to be brought to Suppuration. V. But if the Remedies hitherto proposed prove insufficient to disperse the Tumor, either through some neglect, or any other Cause; the only Means then left is, to bring it to Suppuration. And indeed the Maturation of the peccant Matter is found a very difficult Task in some Cases; insomuch, that the Tumor sometimes remains wonderfully hard and troublesome, even after several Weeks Treatment. Sometimes the stagnating Matter becomes so acrimonious, from its great Inspissation and long Stay, that the Inflammation degenerates into Ulcers, which grow gradually worse and worse, till they end in incurable *Fistulæ.* In the mean time, to promote and quicken the Suppuration, it is generally found of great Service to apply *Emplastrum ex Melle & Farina confectum, necnon Empl. Diachylum cum Gummis:* And where these are insufficient, to make Use of the maturating Cataplasms, which we before recommended in a *Phlegmon, Book* IV. *Chap.* II. § XVI. and in Inflammations of the Breasts, *Book* IV. *Chap.* IV. § VIII. Though we must observe here, that Plasters are much more commodious for Use in Infants, than Cataplasms. Lastly, when the Furuncle is sufficiently maturated, which we may learn from its Softness and yellow Head, we must have Recourse directly to the Scalpel, and having made an Opening, we must discharge whatever corrupted Matter is therein contained. After this is to be applied *Emplast. Diachyl.* and the Ulcer is to be daily cleansed from its Matter, till being freed from all Malignity, it is to be healed with Balsamics.

Furuncles in Infants how to be treated. VI. When sucking Infants are afflicted with Furuncles, it is proper to give the Mother, or Nurse, some purging Medicine, and to order a strict Regimen and Diet: At the same time the Infant should take some gentle laxative Medicine, with absorbent Powders, *ex Lap. Cancror. conch. Mat. Perlar. Pulv. Anisi & Antimon. &c.* to allay the Acrimony of its Juices. Lastly, those Pustules and Pimples, which arise in the Skin of the Face of some People, are no less than small

ſmall Furuncles, and therefore ought to be treated like them. The drinking of Whey and the mineral Waters is extremely uſeful for People who are troubled with theſe.

CHAP. VIII.

Of the BUBO *and* PAROTIS.

The *Bubo* and *Parotis*, what they are.

I. THERE are ſome Kinds of Tumors which ariſe with Inflammation, only in certain or particular Parts, to which they are proper, as in the Armpits, in the Groins, and under the Ears; and theſe are called *Parotids*, when under the Ears; in the other Parts, *Bubos*.

The Kinds of theſe Tumors.

II. The Diviſion or Diſtinction of theſe Tumors, the *Parotis* and *Bubo*, is generally twofold; into ſuch as are *benign*, or ſuch as are *malignant*. Which Diſtinction, as it regards the different Method of Cure, we ſhall explain a little more at large. They are ſaid to be *benign*, (1.) When they ariſe ſpontaneouſly, without any preceding contagious and peſtilential Diſeaſe, as they frequently do in Infants. (2.) Thoſe are alſo of this Kind which come after benign Fevers, being a critical Diſcharge of the Diſeaſe. But the *malignant* are ſuch as happen in the Peſtilence or Venereal Diſeaſe, and are therefore commonly termed *Peſtilential or Venereal Bubos*.

Cauſes of benign *Bubos*.

III. With regard to the *Cauſes* of benign *Bubos*, we muſt obſerve, that they ariſe from the ſame internal Cauſes with all the reſt of the Inflammations; that is, from an Inſpiſſation and Obſtruction of the Blood: So that they differ from other Inflammations only in the particular Part where they are ſeated, as in the Groins, under the Arms and Ears, where there are many ſmall Glands and much Fat.

Diagnoſis.

IV. Nor is the *Diagnoſis* of theſe Tumors difficult, if we do but conſider whether there has preceded any Peſtilential or Venereal Cauſe, to occaſion that Tumor and Inflammation in thoſe Parts. But great Care muſt be taken to diſtinguiſh a *Rupture* from a *Bubo* in the Groin; for by an imprudent Inciſion in ſuch a Caſe, the Life of the Patient may be endangered.

Prognoſis.

V. When theſe Tumors are benign, their Conſequences are uſually milder and leſs dangerous: Becauſe they may be generally either diſperſed or ſuppurated. But a ſpeedy Diſperſion or Suppuration of theſe Tumors is found to be more difficult and of pernicious Conſequences in Patients of an ill Habit: Inſomuch, that a Suppuration of them ſometimes produces *Fiſtulæ*, which are very difficult to cure. Laſtly, the *Parotides* are the moſt difficult to cure, the Inguinal *Bubos* not ſo difficult, and the Axillary *Bubos* are the eaſieſt of all, as they generally tend to Suppuration.

Internal Treatment.

VI. In *Bubos*, which are unaccompanied with any other Diſeaſe, eſpecially thoſe of Infants, the frequent taking of ſome cathartic Medicine, with an Addition of *Merc. Dulc.* is found to be of great Service; as it draws off the glutinous and inſpiſſated Blood from the Part affected, and at the ſame time thins the whole. Other Medicines, which attenuate the Blood, ſhould be alſo uſed, ſuch as we before propoſed for Furuncles. But if there ſhould be any thing of a Fever,

the Advice of ſome prudent Phyſician ought to be called in, who will take care of the Fever, and treat it with proper Medicines.

External Reſolution or Diſperſion.

VII. When the Inflammation is ſo gentle as to give Hopes of Diſperſion, it may be proper to apply diſcutient Plaſters externally; as *Emp. Diachyl. ſimplex, de Spermate Ceti, de Galbano, Diaſaponis, vel de Ranis cum Mercurio, &c.* ſince by theſe Means both *Parotides* and *Bubos* have been frequently diſperſed.

Suppuration how promoted.

VIII. But when the Inflammation proves more violent, the Pains more intenſe, and the diſcutient Plaſters avail nothing, we muſt then ſtrive to bring it to Suppuration, by the Application of *Empl. Diachylon cum Gummis*, which is effectual here. If violent Pains alſo afflict the Patient, the frequent Application of digeſting Cataplaſms warm to the Part, will generally not only mitigate the Pain, but alſo greatly promote a Diſperſion, or elſe a Digeſtion and Maturation. Cataplaſms of this Kind may be made of the Crum of Bread and Milk, boiled to a proper Conſiſtence, mixing afterwards a little Butter and Saffron therewith: Or Meal with Honey and freſh Butter, reduced to the Conſiſtence of a Cataplaſm over the Fire, may be frequently applied warm, and a little Quantity of *Theriaca* may be added to it with Advantage.

The Treatment after Suppurations.

IX. Cataplaſms like the former, or ſuch as we recommended in a *Phlegmon*, and Inflammation of the Breaſts, ſhould be thus frequently applied warm to the Tumor, till the ſtagnating Matter appears to be ſuppurated. As ſoon as we find this, we muſt directly make an Opening, either with the Scalpel or Cauſtic. See before, *Chap.* III. § 10. But great Care muſt be taken in the Opening, not to wound any of the large Veins and Arteries which are near the Abſceſs, as the Jugulars and Carotides in the Neck, the Axillaries under the Arm, and the Crurals in the Groin: For a fatal Hæmorrhage might by that means be brought on. As ſoon as the Abſceſs is opened, the Remainder of the Treatment is to be the ſame with what we have ſo frequently adviſed in other Abſceſſes. More eſpecially it is of Service here to apply *Empl. Diachyl.* as it readily diſperſes or ſoftens any remaining Hardneſs that may adhere to the Mouth of the Ulcer.

CHAP. IX.

Of PESTILENTIAL BUBOS, *where alſo of* CARBUNCLES.

The Kinds of Peſtilential Tumors.

I. PESTILENTIAL Tumors are eaſily diſtinguiſhed by Phyſicians into *Bubos* and *Carbuncles*. And here, by the Name of *Bubo* they comprehend all Tumors, not only ſuch as ariſe under the Ears, Arms, and in the Groins, but alſo in the Neck, Breaſt, Arms, Legs, and other fleſhy Parts of the Body, which ſwell and inflame in peſtilential Fevers; whilſt Nature endeavours to drive out the peſtiferous Matter, which lay concealed in the Body.

Diagnoſis.

II. Peſtilential *Bubos* are diſtinguiſhable from other Tumors, by their happening at a Time, and in Conjunction with the Plague, and from their being accompanied in the Patient with the Symptoms proper to that Diſtemper. For it muſt be here obſerved, agreeable to the Teſtimonies of the beſt modern Writers, who have lived in time of the Plague[a], that People who are ſeized and in-

[a] As by GOD's Providence I never ſaw the Plague, I cannot write any thing of it on my own Experience; yet I was unwilling to be ſilent on ſo conſiderable a Diſorder, and not mention what has been obſerved and confirmed by the beſt modern Phyſicians. I therefore carefully peruſed ſuch

fected

fected by the Diſtemper, if they do not die quickly, are ſhortly to expect theſe Tumors in ſeveral Parts of their Bodies. They appear ſometimes ſooner, at other times later. In ſome the Tumors appear before they are taken ſick by, or ever perceive the peſtilential Venom: In others, the Tumors are two, three, and four Days, after the Appearance of the Diſtemper, before they come out; but they are ſeldom obſerved to come out later. Theſe Tumors or *Bubos* are ſometimes joined with Carbuncles: But though the *Bubos* frequently ariſe without the Carbuncles, yet the Carbuncles ſeldom ariſe without Tumors.

III. It has been this long time obſerved, particularly in the later Plagues, that ſuch Patients as had Tumors come out, without any very bad Symptoms, had them maturate ſpeedily, and were the ſooneſt free from the Diſtemper. Hence it is not without Reaſon affirmed, by ſome of the more learned and modern Phyſicians, that *almoſt the whole Buſineſs of curing the Plague* conſiſted in carefully promoting the Eruption of *Bubos* and Tumors; nor that any one could be preſerved but by means of thoſe Tumors: While thoſe who rightly cure theſe *Bubos*, do alſo at the ſame time rightly cure the Peſtilence. The Caſe being thus, reſolving, diſcutient, and repelling Medicines, together with Bleeding and Purging, are ſo far from proper in the Cure of the Plague, that by throwing the Venom again into the Blood, they deſtroy the poor Patient. Therefore the chief Buſineſs of the Phyſician or Surgeon here, is, carefully to aſſiſt Nature in her Endeavours to throw out the Tumors as ſoon as poſſible, and to bring them ſpeedily to Suppuration and Maturity. *Prognoſis.*

IV. That this may be effected the more readily, it ſeems to be much the beſt Way to order the Patient to keep Houſe upon the firſt Appearance of the Tumors, or rather to keep in a warm Bed, to be more ſecure from the Air. For by this Means the Patient reſts more ſecurely from the external contagious Air, and by the Uſe of proper external and internal Medicines, the *Bubos* may be more regularly expelled and brought to Suppuration. General Treatment.

V. Externally it is very ſerviceable to rub the tumified Part pretty ſtrongly with the Hands or Cloths, and what is ſtill preferable, to apply external maturative and emollient Medicines, whereby they will come out the ſooner. And we ſhall alſo here find great Benefit from the Uſe of a Cataplaſm made *ex Fermento Panis calido, vel ſolo, vel & cum Sale atque Sinapi contrito.* By means of this, the tenſe Parts are relaxed and ſtimulated; whereby the peſtilential Matter may be received and caſt off from the Blood, and come afterwards to Suppuration. Of the like Virtue are not only the Cataplaſms, which we before recommended for ſuppurating other Tumors, in *Chap.* II. § 16. and *Chap.* IV. § 8. but more paticularly thoſe which are made *ex Cepis ſub cineribus toſtis, atque cum Theriaca & Butyro ſubactis, vel etiam ex Pane Triticeo ſive Semilagineo interiori, cum Lacte atque Croco probe concacto.* But there are ſome Surgeons who prefer emollient Plaſters to Cataplaſms: Becauſe the frequent Renewal of the Cataplaſms requires the Body to be often uncovered, whereby the Perſpiration is impeded and diſturbed. The emollient Plaſters uſed inſtead of the Cataplaſms, are the *Empl. Diachylum ſimplex vel compoſitum*, or ſuch as follow. The excellent External Treatment.

as had obſerved the laſt of this Diſtemper in *Auſtria, Bavaria, Sileſia, Pruſſia, Poland, Holſatia, Denmark*, and *Marſeilles*, endeavouring to reduce what they had obſerved with regard to the Symptoms, *&c.* to a Sort of *Compendium*, that my Reader might rely on them afterwards.

BARBET, in his Treatise *De Peste*, particularly recommends the following Plaster, which seems very efficacious:

℞. *Empl. Diachyl. c. Gummis, de Mucilaginibus ana* ℔ ß. *Seminis Sinapi pulverisati* ʒiij. *Unguenti Basilici* ʒiv. *m. f. Empl.*

A Plaster of this is to be applied to the tumified Part, after it has been first well rubbed, and to be renewed every or every other Day. The celebrated Dr. HODGES, in his Description of the great Plague in *London*, *An.* 1665, greatly recommends the following:

℞. *Empl. Oxycroc.* ʒiij. *Gum. Galban. colat. Caranæ ana* ʒj. *Picis Naval.* ʒij. *cum Ol. Chamæmel. liquato f. Empl.*

This may be used like the former. Nor is the Use of that Plaster to be despised here, which is made of Honey, Meal, and the Yolks of Eggs. But the Blistering with *Cantharides* and dry Cupping, used by the Antients to forward Suppuration, are wholly rejected by the most expert of the modern Physicians in the Cure of the Plague [a].

A particular Observation of BEINTEM's.

VI. But what the celebrated *German* Physician, BEINTEM, observes, is not a little surprising and worthy of our Consideration. He asserts, in the last Book of his *Latin* Treatise on the Plague, that pestilential *Bubos* were frequently dispersed and cured without any Danger, merely by the Application of warm Ashes. Though there is scarce any body besides him, that advises to discuss or cure pestilential *Bubos*, without bringing them to Suppuraion, or that ever found such a Method safe and successful: But in the Judgment of BEINTEM, the pestilential Venom was not drove into the Blood again in the Discussion, but was rather attracted and carried off by the Ashes.

Internal Method of Cure.

VII. To these external Applications it will be proper to join internal Medicines; by the Help of which, the Venom lurking in the Body may be expelled in a gentle Sweat. But such sudorific Medicines, as are very strong and heating, have been always found dangerous and pernicious by the modern Physicians. Warm and watery Drinks have generally been found more safe and useful in this Case, as being particularly adapted to temperate the Blood, and excite a gentle Sweat. Among these Drinks, we may reckon common Tea, with the Addition of a little Saffron; or Infusions of other alexipharmic Herbs, as *Salv. Scordium*, *Ruta*, *Millefol. Betonica*, *&c.* or else the plentiful drinking of some warm Ptisan, made with or without *Rad. Scorzoner.* taken till it excite a constant but very gentle Sweat. And as the more vehement Sort of Sudorifics are improper, so the drinking of cold Liquors are generally found equally pernicious: For they not only wonderfully suppress the gentle Sweat, but also strike in the *Bubos*, in whose Eruption a happy Cure chiefly consists. The Air of the Patient's Chamber should be temperate, neither too hot nor too cold: His Bed should also be the same, and made as convenient as possible. If the Patient should find himself very weak, but without any great Heat, it will not be improper to give a few Drops of *Elix. Proprietatis vel Mixture. simplicis*, *Tinctur. Bezoart. Essent. Myrrhæ*, *Ess. Scordii*, *&c.* about thirty or forty Drops for a Dose two or three Times a Day, in some warm Liquor: Or, it may be

[a] Yet SCHREIBER, a very modern Writer on the Plague, declares, that in *Russia* Blisters were applied to pestilential *Bubos* with great Success, laying on afterwards the emollient Cataplasms just now recommended. See his *Obs. on the Plague*, *p.* 23.

requisite

requiſite to give ſome proper bezoartic Powder[a]. On the other Hand, in warm Conſtitutions, where the Heat is too violent, it will be proper to give *Nitrum depuratum cum Lapidibus Cancrorum Conchiſque præparatis:* Alſo temperate Acids, as *Succ. Malor. Citreor. Ribeſior. Granator. &c. vel Syr. ejuſd. cum Aqua Borag. Bugloſſ.* or any thing that is temperately cooling, to which the Patient has a Fancy; and if the Heat be ſtill more vehement, it may be neceſſary to drop in *Spiritus Vitrioli Dulcis aliquot guttulas.*

How the Abſceſs is to be opened.

VIII. The Medicines hitherto propoſed are all of them allowed to be the moſt proper to be often taken, and ſufficiently powerful to drive out any peſtilential Venom that may lurk in the Blood, agreeable to the Writing and Practice of the moſt expert Phyſicians, who have lately wrote in *Poland*, *Pruſſia*, *Denmark*, *Auſtria*, *Hungary*, *Ratiſbon*, &c. The Uſe of theſe ſhould therefore be continued 'till the Tumors are either diſperſed (which they allow to ſometimes happen) or ſuppurated and brought to Maturation, which is the common and conſtant Practice. In ſome Caſes the Tumor turns ſuddenly to Suppuration; and in others it remains for ſome Weeks without being any thing ſofter. When this is the Caſe, it is neceſſary to continue the Uſe of the forementioned Remedies, 'till the Tumor either breaks of itſelf, or is fit to be opened like other Abſceſſes by Inciſion with the Scalpel, that the peſtilential Matter may be diſcharged and prevented from returning into the Blood.

Treatment after Aperation.

IX. When the Abſceſs is thus opened, we muſt proceed directly to the cleanſing of it; and after the Cleanſing, the Wound is to be healed with ſome vulnerary Balſam, as we before propoſed. To deterge and cleanſe, the beſt that can be uſed here, is *Ung. Digeſt. cum Theriac. Balſ. Sulph. Terebinth. portiuncula permixtum.* At each Dreſſing the Matter is to be gently diſcharged from the Ulcer, and, when cleanſed, it is to be treated with the forementioned Ointment; but without Tents, unleſs its Opening ſhould be very narrow: Then applying ſome proper Plaſter, it may be bound up again as before. The beſt Plaſters for this Purpoſe are, the *Emp. Diachyl.* or that made *ex Melle & Farina*; the Uſe of which may be continued 'till it is perfectly healed up.

The Inciſion is not to be made too ſoon.

X. With regard to the Time of opening the Abſceſs by Inciſion, Phyſicians are not agreed upon it: For there are many, eſpecially of the modern Authors, who have wrote on the Plague, that forbid the Opening of Peſtilential *Bubos* till they are perfectly ripe and ſoft. Beſides, theſe *Bubos*, agreeable to the Obſervation of many, do generally ſuppurate and break of themſelves; inſomuch, that, in the Opinion of theſe Gentlemen, an Opening made by Inciſion too ſoon, may greatly endanger the bringing on ill-conditioned *Fiſtulæ*, a Stiffneſs in the Limb, and even a Gangrene[b]. Others, on the contrary, will have it, that an Opening made by Inciſion in the very Beginning of the *Bubo*, is not only without Danger, but even directly ſuited to preſerve the Patient, and recovering him the ſooner from his dreadful Diſeaſe. *Vid.* EPHEM. *Nat. Curioſ. Cent.* VII. *Obſ.* 69. *pag.* 170.

[a] Here SCHREIBER recommends the following Powder to be given every three Hours, having in the firſt Place vomited the Patient with *Ipecac.* ℈. *Antimon. Diaphor. Nitrat Gr.* xv. *Merc. dulc. Gr.* i *Camphoræ Gr.* ij. *M. F. P. in Sero Lactis vel Hordei decoct. tepid. ſumendus, ſuperbibendo ejuſdem,* ℥ v.

[b] The Author of a *French* Treatiſe, entitled, *Obſervations ſur la Saignée de Pied*, obſerves, that in the Plague of *Marſeilles*, too early an Inciſion of *Bubos* was generally unſucceſsful.

XI. Notwithſtanding ſeveral of the antient Phyſicians have contended for a ſpeedy and entire Extirpation of Peſtilential *Bubos* by the Knife, in order to diſcharge the contagious Venom; yet the Moderns do not without Reaſon diſſent from their Opinion. For ſuch a Method of Cure is not only found to be too harſh, but alſo of very dangerous Conſequence in many Parts of the Body. In like Manner, all Emetics, Cathartics, Bleeding, and hot cordial Medicines are, by the unanimous Conſent of the Moderns, condemned as things very pernicious in the Peſtilence; notwithſtanding they were held in ſo great Eſteem by the Antients. Such were the Bezoardic Tinctures, hot Eſſential Oils, and volatile Antipeſtilential Spirits, together with the *Theriaca* and *Mithridate*.

CHAP. X.

Of the PRESERVATIVES *particularly neceſſary to defend and preſerve the Phyſician or Surgeon from* PESTILENTIAL CONTAGION.

Preſervatives hitherto uncertain.

I. HITHERTO we have been treating of Peſtilential *Bubos*. But before we proceed to Carbuncles and *Anthraces*, it will be proper to ſay ſomething of the means that may be uſed by the Surgeon to defend himſelf from the peſtilential Contagion, that he eſcape free in viſiting the infected. But before we take upon us this Taſk, it will be firſt proper to inform our Reader that we believe there has not ever been yet found a certain Preſervative for this Purpoſe: So far from it, that many of the Remedies purpoſely contrived and recommended, are wholly uſeleſs and improper; even ſome of them are very dangerous when lodged in imprudent Hands, and are therefore to be cautiouſly avoided.

Which of theſe Methods are to be avoided.

II. There are many, who aſſert frequent Purging to be wonderfully adapted to carry the peſtilental Contagion off the Body, and prevent it from getting into the Blood. There are Others, who lay great Streſs upon ſudorific Medicines, Scarifications, and frequent Bleeding, as of great Service to defend the Body from the peſtilential *Virus*. Whereas all of them, unleſs the Body is habituated to them, are great Deſtroyers of the Strength; and by that means, rather than defend, they make the Body more obnoxious to, and ſuſceptible of, the contagious Venom. Others again believe nothing more effectual as a Preſervative againſt the Contagion, than the frequent and plentiful drinking of certain hot Spirits or Waters, dignified commonly with the Title of Epidemic or Antipeſtilential. But we ſhall be ready to judge the uſe of theſe alſo to be equally foreign, and altogether improper, if we do but conſider what violent Heats the plentiful uſe of ſuch ſpirituous Liquors will excite in the Blood, beyond what it ſhould naturally ſuffer, and by that means it may be rendered more liable to fall into a Peſtilential Fever: Unleſs the Perſon has been accuſtomed to the uſe of ſuch Liquors before, or elſe uſed them with great Moderation. The ſame Judgment we muſt always paſs upon the common Spirit of Wine, *Aqua Vitæ*, and the alexipharmic Electuaries and Oils, with all other heating Medicines, ſince their Nature and Effects are directly the ſame. Laſtly, there are ſtill others who confide in things hung about the Neck, as Arſenic, Mercury, Sand, Camphire,

and *Rad. Colchici*; or elſe the keeping open large Iſſues, from all which they expect a ſecure Defence from the Plague. When at the ſame time there can be found little or no Virtue in either, or all of them, to reſiſt the peſtilential *Virus*. It has been obſerved by antient Writers, that Perſons afflicted with Ulcers of any ſtanding, eſcaped the Infection of the Plague: Which Obſervation is confirmed by SCHREIBER amongſt the Moderns. In that Caſe thoſe Ulcers ſhould by no means be healed. On which account ſome Phyſicians have adviſed Iſſues as Preſervatives; but to no Purpoſe.

III. The beſt and readieſt Defence againſt the Plague ſeems in general to conſiſt in this, that ſuch as are able ſhould remove out of the peſtilential or infected Air into ſome healthy Part of the Country; or, wherever they are, they ſhould keep from the Company of ſuch as are already infected, and not meddle with their Cloths, Bedding, Meat, Drink, or Veſſels; and above all, if poſſible, not to make themſelves over afraid of the Diſeaſe: But let them always keep a cheerful and confident Mind, with a proper Diet. But for the Phyſician and Surgeon, whoſe Buſineſs is to relieve the Sick, and for that Purpoſe muſt enter dangerous Places, it is beſt for them to keep up a couragious Mind, and not be anxiouſly afraid of Diſeaſes, nor even the Plague. For it is to be hoped that thoſe, who riſque themſelves with theſe Precautions to ſuccour peſtilential Patients, will be preſerved in Safety by a Divine Providence. SCHREIBER recommends, as a ſafe Preſervative, the taking every Evening, *Merc. Dulcis & Camphor.* of each 1 *Gr.* The beſt Defence againſt the Plague:

IV. But beſides, there are ſeveral human Cautions and Obſervations neceſſary to be regarded by the Phyſician and Surgeon. The chief of theſe are, that *they ſhould never go faſting to viſit a Patient ſick of any contagious Diſeaſe, and much more of the Plague:* But they ſhould always eat ſomething and drink ſome ſtrong Liquor before-hand, in order to defend themſelves from the peſtilential Contagion and infected Air. Some Phyſicians therefore always *eat Bread and Butter, and drink a Draught of* Spaniſh *or Wormwood Wine*, or ſome other ſtrong Wine, before they offer to ſet a Foot in the Patient's Houſe. By this Method, the celebrated Dr. HODGES writes, that he preſerved himſelf from Infection in the violent Plague at *London*, chiefly by drinking *Spaniſh* Wine. DIEMERBROEK tells us, that by the Benefit of *Rheniſh* Wine he eſcaped the Infection in the Plague at *Neuburg*. Others prepare themſelves in a Morning, *by eating a ſlice of Bread ſoaked in good Vineger*, either ſimple, or wherein Rue has been infuſed. SYLVIUS has contrived an acidulated Medicine purpoſely for this Uſe, which the Apothecaries call *Aqua Prophylactica Sylvii*; and is to be drank to the Quantity of one or two Spoonfuls in a Morning, either alone or with a ſlice of Bread, by ſuch Surgeons as are going to viſit peſtilential Patients. Others again aſſert it to be confirmed by Experience, that ſome good Broth or Suppings, eſpecially of Chocolate, are of great Service in keeping off the peſtilential Venom. CARDILUC mentions his eating a Citron every Morning, *Lib. de Peſte, p. m.* 70.—Upon the whole it is my Opinion, that in hot Conſtitutions, Acids, and Coolers, are the beſt Preſervatives; in cold, the Reverſe, at leaſt moderate Cordials. (1.) before we viſit the Patient.

V. Being come to the Patient's Apartment, great Care muſt be always taken *that we neither eat nor drink there, nor even ſwallow our Spittle.* For there is no ſmall Danger in that Caſe, of ſwallowing the volatile peſtilential Exhalation (2.) while we are with the infected Patient.

or

or Effluvia, by which means our internal *Viſcera* and Blood would be infected. For which Reaſon we cannot approve of the Cuſtom of ſome who are continually chewing and ſwallowing Myrrh, Cinnamon, Angelica, Zedoary, or the like, all the Time they are in an infected Place. For as ſuch Things excite a plentiful Diſcharge of *Saliva* into the Mouth, it is hardly poſſible but ſome of the infectious Effluvia will be intangled therein, and ſo go down into the Stomach and get into the Blood. But the chewing of ſuch Aromatics may be very proper at home, as they are in their own Nature wholſom; the Uſe of them in the former Caſe being improper only as to Time and Place. We ought alſo to be particularly careful *not to ſtay longer in the infected Place or Apartment of the Patient than our Buſineſs really requires:* For there is great Danger that the Strength of our Conſtitution, however conſiderable, may be overcome by the too great Quantity and Force of the peſtilential *Virus:* Whereas we might have eaſily reſiſted and ſuſtained a ſmall Quantity of the ſame infectious Effluvia.

(3.) when we are returned home from the Patient.

VI. After we are returned home from the Patient, it is much the ſafeſt way to waſh our Hands and Mouth well with Vinegar mixed with Water: For if there be any thing prevailing againſt the peſtilential Venom, Vinegar ſeems to be the chief. The Cloths are to be changed for others, and expoſed to the free Air, and to be afterwards perfumed. Then Suppings of Coffee, or Tea of *Scordium*, Sage, and the other alexipharmic Herbs ſhould be plentifully uſed. For theſe excite a gentle Sweat, and ſo drive out ſuch contagious Particles as might happen to be mixed with the Blood, keeping it free and temperate.

A proper Diet is to be ſtrictly obſerved.

VII. As an accurate Regimen of the Diet is always healthful in other Caſes, ſo alſo in Places where the Peſtilence rages it is found to be altogether neceſſary. Therefore ſo much Aliment, ſolid and fluid, is always to be taken at one Time, as is requiſite to keep up the Strength of the Body, and may be conveniently and perfectly digeſted. But Care muſt be taken not to burthen Nature therewith. For it can ſcarce be ſaid how vaſtly Intemperance weakens the Stomach and Body, and renders it liable to contagious Diſtempers; from the Crudities and undigeſted or corrupt Matter, which is by that means lodged in the Blood. Modern Phyſicians obſerve, that there is no Occaſion for chooſing a particular *Diet:* Ordinary or common Food may be taken as uſual, if it be not againſt Cuſtom and Temperance. In Broths and Suppings ſhould be always mixed, whenever it can be done conveniently, ſome Vinegar, or the expreſſed Juice of Lemons or Citrons, a few Capers, or ſome other ſubacid Thing of the like Kind. For the Uſe of every thing gently acid is uſually very ſafe and beneficial in the Peſtilence: So that a moderate Plenty of all Sorts of Pickles are in this Caſe found very ſalutary[a]. There is no need of any great Change in the common and daily Drinks: But this I muſt obſerve, that thoſe conſult beſt for their Stomach and the Strength of their Conſtitution, who drink *Spaniſh*, *Rheniſh*, or any other good Wines at their Meals. If any one be accuſtomed to *Tobacco*, I would adviſe him to keep up the Habit: But I would not perſuade ſuch as diſlike it, or are of a hot Conſtitution, to take Tobacco againſt their natural

[a] The Phyſicians of *Marſeilles* were of Opinion, that an Acid was the Cauſe of peſtilential Diſorders; becauſe DEIDIER in the Diſſection of Subjects who had died of the Plague, had found the Hearts exceeding large, and the Blood in them coagulated. But this to me is no Proof at all.

Appetite

Appetite as a Preſervative from the Peſtilence. For I think it has been this long Time obſerved that Lovers of Tobacco have been equally as often and eaſily ſeized by the Plague as others who do not uſe it. Laſtly, where Perſons have been before accuſtomed to the Uſe of Stomachics, Sudorifics, Vomiting, Purging, Scarification, Bleeding, and the like, at certain Times or Seaſons, they muſt be cautious not to break off too ſuddenly from ſuch Habits, but rather to continue them at their ſtated Times [a]. But for Coition, as it greatly weakens and even ruins the Conſtitution at ſuch an unfavourable Time, eſpecially if the Habit of the Body be naturally infirm, that ſhould be equally avoided with the Peſtilence itſelf.

External Helps againſt the Plague.

VIII. In the laſt Place, in order to keep off or correct the peſtilential Effluvia, it will not be improper frequently to hold a Sponge to the Noſe which has been firſt wetted with ſimple Vinegar, or that wherein Rue or Lavender has been infuſed. The Chamber ſhould alſo be fumigated with Juniper Chips, Gunpowder and Brimſtone, or with Vinegar, ſprinkled upon a red hot Tile or Iron, in order to expel and correct the peſtilential Air.

CHAP. XI.

Of CARBUNCLES, *or* ANTHRACES.

A Carbuncle what.

I. A CARBUNCLE is ſaid to be an Inflammation which ariſes in Time of the Plague with a Veſicle or Bliſter, almoſt like thoſe produced by burning, or the Application of Cantharides. But this ſort of Inflammation generally terminates in a *Sphacelus*, and putrifies the ſubjacent Parts down to the Bone, they becoming as black as a Coal, inſenſible and dead. And this ſeems to be the Reaſon why they are by the *Latins* termed *Carbunculi*, and by the *Greeks Anthraces* [b].

The Nature of Carbuncles.

II. A Carbuncle always breaks out very ſpeedily, even in the ſpace of an Hour or two, attended with Heat and Pain. Upon opening it, there is diſcharged a darkiſh and ſometimes limpid or watery *Sanies:* Within, the Fleſh is of a black Colour, a *Sphacelus* having then ſeized the Parts, which ſpreads more and more by Degrees: But the putrid Fleſh in thoſe who recover, ſuppurates and parts from the ſound. The ſize of theſe peſtilential Bliſters is various, more or leſs, as is alſo their number in the ſame Patient. For there is no Part of the Body which they do not infeſt: And they generally appear in company with *Bubos*; indeed they are ſeldom or never to be obſerved without *Bubos*.

Cauſes.

III. The immediate and uſual Cauſe of Carbuncles is doubtleſs a violent Inflammation, excited in the Blood by the peſtilential Venom. The Inflammation is ſpeedily and ſuddenly followed by a Corruption and Sphacelation of the Parts. But the Parts and Juices do not ſuppurate into Matter, as is uſual in other Tumors; but whatever is internally corrupted ſeparates and intirely falls off. For the inflamed Parts ſuppurate at the Margin or Extremity of the Inflammation; ſo that if the Patient does not dye ſuddenly, the ſphacelated Parts which have

[a] This CELSUS very judiciouſly recommends, *Lib.* I, *Cap.* 10. *de Peſtilentia.*

[b] As to the *Term. Carbuncle*, Vide CELSUS, *Lib.* V. *Cap.* 28. *de Carbunculo. Lib.* VI. *Cap.* 6. § 10. & *Lib.* VI. *Cap.* 18. § 5.

the

the Carbuncle are by that means ſeparated from the ſound and living Parts, and are by degrees wholly caſt off.

Prognoſis. IV. Experience witneſſes that the Events of a Carbuncle are very doubtful, and much worſe than thoſe of *Bubos:* Eſpecially if the Eruptions turn directly either livid or black. But when the Puſtules are red at firſt, and then gradually turn to a Citron Colour, the Danger is much leſs. Thoſe Carbuncles which ariſe in the Face, Neck, Breaſt, or in the Arm-pits, are obſerved to be of the worſt Kind; for they generally kill the Patient.

Internal Treatment. V. As for the internal Treatment of Carbuncles, whether by Diet or Medicines, the very ſame is to be obſerved in this Caſe, with what we recommended in *Chap.* IX. § 7. of peſtilential *Bubos.* For the chief of the Cure conſiſts in keeping the Patient in a gentle and conſtant breathing Sweat. But SCHREIBER, in his *Obſerv. on Peſtilential Carbuncles*, conſidering them as a Species of *Sphacelus*, ſtrongly recommends the *Peruvian* Bark, as given in Fevers.

External Treatment. VI. The chief Deſign of the external Treatment is, to quicken, as much as poſſible, the Separation of the Parts ſphacelated with the Carbuncle from the ſound. Therefore ſome of the modern Phyſicians uſe only Scarification in this Caſe, with very good Succeſs: For by cutting away frequently the corrupted Parts quite to the ſound, they let out the acrimonious and peſtilential Matter with the corrupted Blood[a]. Others only open the Eruptions with a Pair of Sciſſors, and having diſcharged the Matter, they often waſh the Carbuncle with *Sp. Vin. Camph.* or *Sp. Vin.* wherein has been digeſted a little *Theriaca.* They afterwards apply a maturating Cataplaſm, like the following.

℞. *Mellis cochlearia* iv. *Fermenti panis cochlearia* iij. *Vitell. Ovor. N°* ij. *Sapon.* ℥ ß. *Quæ probe commiſceantur, calidaque ſuperimponantur. Vel,*

℞. *Farinæ Siligin. vel Tritic.* ℥iij. *Aceti* ℥ ß. *quæ ex Aqua vel Lacte ebutyrato decocta atque in Cataplaſma converſa cum Mellis* ℥j. *Crocique contriti* ℥j. *miſceantur, calidaque ſæpiſſime ſupradentur.*

Whether the Carbuncle ſhould be cut out. VII. The Application of the forementioned Cataplaſms is to be continued till the Carbuncle ſeparates or caſts off from the ſound Parts. For it is better to diſſolve the Carbuncle gradually from the adjacent ſound Parts, than to cut it out all at once. Nor are Inſtances wanting where the Patient has been killed by an unſeaſonable and entire Extirpation of the Fleſh and Carbuncle: For we learn by Obſervation, that moſt ſharp Pains and other dangerous Symptoms uſually follow ſuch an over-powerful Remedy. But where the greateſt Part of the Carbuncle is already ſeparated from the live Fleſh, the remainder may be ſafely divided by the Scalpel.

VIII. But if an ill-conditioned luxuriant Fleſh grow internally either of itſelf, or from the Extirpation being made too ſoon, it is upon all Accounts neceſſary to entirely conſume it by the Application of *Ung. Ægyptiacum vel fuſcum Wurtzii*, or elſe by the Ointment following:

℞. *Mellis cochlearia* ij. *Vitell. Ovor, N°.* ij. *Alum. uſti pulv. Gentianæ Ariſtolochiæ ana* ℥j. *m. f. Unguentum.*

[a] SCHREIBER adviſes ſcarifying, as very advantageous, *Lib.* IX. *p.* 23.

IX. If

IX. If the Inflammation inclines the adjacent Parts to a Gangrene, which is not unuſual, it will be proper to uſe the following Ointment: How to remove a ſupervening Gangrene.

℞. ⊙ *Abſinth.* ℥ ſ. *Herb. Scord. Flor. Sambuc. Chamæmel. ana* M j. *Aq. ſimpl.* ℔ ij. ſ.

When theſe have been well boiled and ſtrained, mix of the beſt *Sp. Vin. Camph.* ℥ vj. *Theriac.* ℥ ij. then let it be applied very often and hot to the Parts, by means of Linen Rags folded together, or Compreſſes, till the Violence of the Inflammation abates.

X. But when theſe very bad Symptoms are abſent, after a Separation of the Carbuncle from the live Parts, it will be proper to cleanſe the Ulcer with *Ung. Fuſ.* WURTZII, or the digeſtive Ointment before deſcribed in *Chap.* IX. § V. *Of peſtilential Bubos.* And this ſhould be done perfectly, leſt any of the peſtilential Venom ſhould remain behind, and excite the former Symptoms again. Therefore the Deterſion of the Ulcer ought to be continued till there remains nothing of theſe peſtilential Symptoms; and when that is effected, the Wound may be healed like other Abſceſſes: More eſpecially, it ſhould be dreſſed with Lint dipped in *Eſſent. Myrrhæ & Aloës*, applying over an *Emplaſt. de Lithargyro*, or the like, till the Ulcer is perfectly cured. What is to be done after a Separation of the Carbuncle.

XI. There are many of the more celebrated Phyſicians, who, with CELSUS, allow nothing to be more effectual in extirpating and curing Carbuncles, than the actual Cautery, or a red-hot Iron. With this they order the dead Parts to be burnt till the Fleſh becomes in every Part ſenſible of the Pain; by which means there ſeems to be no Reliques left of the Carbuncle. This Method was obſerved by Dr. HODGES to be the readieſt Way of Cure for Carbuncles in the great Plague at *London*. But there are abundance of Circumſtances which prohibit the forementioned Method of Cure by the Cautery from being uſed in many Caſes; as the Dread of the Patient, the Tenderneſs and Conſequence of the Parts, *&c.* that rather perſuade ſuch Methods of Treatment as we have before propoſed; which are therefore to be made uſe of here. SCULTETUS ſays, that a dying Carbuncle will ſtart out afreſh (which is of dangerous Conſequence) on holding a red hot Iron at a Diſtance. Whether Cauteries are to be applied.

XII. The celebrated SYLVIUS thought *Butyrum Antimonii* an efficacious Remedy to extirpate Carbuncles, if the circumjacent Parts were anointed with it. For, in the Opinion of SYLVIUS, it not only prevents the Diſorder from ſpreading, but it alſo readily makes an Eſchar that divides the ſound Parts from thoſe which are corrupted, and at length wholly ſeparates them. But ſuch of the modern Phyſicians as have wrote profeſſedly on the Plague at *Vienna* and *Ratiſbon*, do by no means agree with him. For if we may believe theſe, the *Butyrum Antimonii* is ſo far from being ſerviceable in Carbuncles, that it rather excites the worſt of Symptoms, and often brings ſudden Death. In the mean time, we find BOTTICHERUS aſſenting to the Opinion of SYLVIUS, in his *Loimographia Hafnienſis*: Where he frequently praiſes and recommends the *Butyrum Antimonii* as an excellent Remedy for this Purpoſe. And SCHREIBER tell us, that many Surgeons applied the *Lapis Infernalis* to the Lips of the Carbuncle; and that, in conſequence thereof, it ſeparated with great Eaſe, by means of a digeſtive Ointment, and an emollient Cataplaſm. But whichever be the Caſe, the Method by uſing *Butyrum Antimonii* is, in my Opinion, more ſafe and preferable to the Way Whether it be proper to apply *Butyrum Antimonii*.

of Cure by the Cautery. Laſtly, whichever of theſe Methods of Cure practiſed, the Buſineſs afterwards will be always firſt to perfectly cleanſe the Wound, and then to heal it up.

CHAP. XII.

Of VENEREAL BUBOS.

What a Venereal *Bubo* is.

I. A VENEREAL *Bubo* is a Tumor with Pain and Inflammation ariſing in the Groins or Arm-pits, after Contact with an impure Woman. *Bubos* of this Kind are diſtinguiſhed into two Sorts. (1.) Such as ariſe without any other Symptoms of the Venereal Diſeaſe: Or, (2.) Thoſe which are accompanied with the other uſual Attendants of the Diſeaſe, as a *Gonorrhœa*, and Venereal Ulcers, uſually termed Shancres.

Symptoms.

II. *Bubos* of this Kind uſually ariſe, as we before obſerved, after Contact with an impure Woman, who is afflicted with the Venereal Diſeaſe: After which, they ariſe ſometimes ſooner, and ſometimes later; that is, within a few Days after Infection. The Tumor then ariſes in the Patient with Hardneſs, Redneſs, and Pain, either in one or both the Groins, and ſometimes in the Arm-pits. So that if we regard the Colour of Venereal *Bubos*, there is little or no Difference between them and the Benign Sort. See *Chap.* VIII. foregoing. Care muſt therefore be always taken, that we do not miſtake one for the other: For ſuch as take Benign *Bubos* for Venereal ones, generally treat the Patient with an unjuſt Suſpicion, Contempt, and a harſh Method of Cure. On the other hand, when Venereal *Bubos* are miſtaken for Benign ones, there is Danger leſt the Patient, being treated in the mild Method ſuited to Benign *Bubos*, ſhould be unhappily brought into a confirmed *Lues*.

Diagnoſis.

III. The moſt certain Signs that theſe *Bubos* are Venereal, are the Patient's having had to do with unclean Women, and from their being, or having been, accompanied with a *Gonorrhœa*, Shancres, or other Symptoms of the Venereal Diſeaſe. When any of theſe are preſent, they give ſtrong Reaſon to ſuppoſe the *Bubo* to be Venereal: But when they are abſent, they take off, or at leaſt greatly diminiſh, the Probability of the *Bubos* being virulent. As ſoon as it appears from the Patient's Confeſſion, or other Circumſtances, that the *Bubos* are Venereal, we muſt proceed accordingly with Expedition to a proper Method of Cure. Though this Diſorder generally admits a pretty eaſy Cure at the Beginning, yet, when it has gained Ground, either from Delay, improper Treatment, or an irregular Courſe of Life, a Cure becomes then extremely difficult, and it frequently turns into the *Lues* itſelf.

Whether a Diſperſion be ſafe.

IV. With regard to the Cure, there are many Phyſicians who hold a Diſperſion of Venereal *Bubos* equally improper with the Peſtilential: Becauſe, by that Method, the venereal Venom returns, contrary to the Deſign of Nature, into the ſmall Veſſels; and, by infecting the Blood, brings on a Pox. They therefore judge it neceſſary to abſtain entirely from Bleeding and Purging, and to forward the Tumor to Suppuration as faſt as poſſible. But with Submiſſion to theſe Authors, I cannot be of their Opinion. For the Cure by Suppuration is not

only ſlow and tedious, but alſo attended with many Inconveniencies: Whereas I have frequently experienced, with the greateſt Safety, much better Effects from the taking of Cathartic and Mercurial Medicines, together with a Decoction of the Woods, and other ſuch Purifiers of the Blood. For by this means the Virulency may be diſcharged from the Body much ſooner than by Suppuration; and the Tumors may be ſafely diſperſed without Danger of a *Lues*, or other bad Symptoms.

How the Diſperſion is to be effected.

V. Whether the Patient have a *Gonorrhœa* or not, the beſt Way is to purge him with frequent and large Doſes of *Merc. Dulc.* as is uſual in carrying off *Gonorrhœas*. For in curing a *Gonorrhœa*, you alſo cure *Bubos* generally at the ſame Time, and by the ſame Means. Nor can *Bubos*, be happily cured till the Body is firſt quite freed from the venereal Venom. When there is a conſiderable Inflammation, eſpecially in young plethoric Habits of Body, it ſeems to be altogether neceſſary to bleed, and give mercurial Purges afterwards, with a Decoction of the Woods, and Eſſences which purify the Blood. Externally to the Tumor ſhould be applied ſome diſcutient Plaſter; as *Emp. de Meliloto*, *de Ranis cum Mercurio*, *Diachylum*, or the like. At the ſame time the Patient ſhould keep ſtrictly to a regular Diet and Courſe of Life; taken ſcarce any thing but Ptiſans made with Barley, Oats, or the like. In the room of ordinary Drink may be taken a Ptiſan, made of Barley, Liquorice, and Aniſe or Fennel: For a Change may be drank a Decoction of the Woods; and for a greater Variety, a little clear and very ſmall Beer. Wine and all other ſtrong fermented Liquors ſhould be carefully avoided, as they generally encreaſe the Inflammation. If the Patient be kept up carefully to theſe Reſtrictions, Venereal *Bubos*, which are not yet inveterate, may be diſperſed very commodiouſly, and without Danger.

Suppuration how to be promoted.

VI. But if Advice ſhould be called in too late or the *Bubo* prove ſo obſtinate as not to give way to Diſperſion; or if upon any other account the Surgeon is deſirous to effect a Cure in the Way of Suppuration, in order to diſcharge the *Virus* and prevent a *Lues*, he is to diligently promote and quicken the Maturation as faſt as poſſible. But the moſt powerful Medicines to promote Suppuration have been mentioned at *Chap.* III. § IV. and *Chap.* IV. § VIII. Though it is beſides not improper here to rub the *Bubo* with Linen Rags, or the Fingers greaſed with Butter or Oil, till they grow red with Pain; adding afterwards a maturating Plaſter: For by this means a Suppuration is greatly promoted and accelerated. The Plaſter to be afterwards applied may be of *Diachylum cum Gummis*, *vel Emplaſtrum de Galbano*, particularly when the Patient can as yet walk pretty well. The Plaſter may be taken off, and the *Bubo* rubbed well, three or four times a Day, more or leſs, agreeable to the ſeveral Circumſtances. Violent Dancing, Boxing, Fencing, and other ſuch Exerciſes, are alſo here very ſerviceable for promoting the Suppuration. But if the Patient cannot walk any longer from his Pains, which is frequently the Caſe, it may be proper to apply a maturating Cataplaſm inſtead of a Plaſter, ſuch as we have deſcribed in the Chapters juſt now mentioned; which are uſually much more effectual than Plaſters. The beſt of theſe Cataplaſms for this Caſe, are thoſe *ex Cepis ſub cinere toſtis*, *vel Farina et Melle*, *vel ex Fermento*, *vel denique ex mica Panis Siliginei cum Lacte atque Croco decocta*; which are to be now and then applied warm to the Parts, after they have been firſt well rubbed.

Internal Treatment.

VII. While the former are carrying on, internal Medicines muſt be alſo called in to Aſſiſtance. The Patient ſhould take a warm Draught of a Decoction

of the Woods two or three Times in a Day, about eight, ten, or twelve Ounces at a Time, with thirty or forty Drops of *Eſſent. Lignor. Pimpinellæ albæ, Fumariæ, vel Scordii, vel his ſimilimum, & Mercurii Dulcis aliquot granis quotidie.* For as theſe greatly attenuate the Blood, drive it towards the Skin, and correct the venereal Venom, they alſo greatly promote either a Diſperſion or a Suppuration.

The Manner in which *Bubos* are to be opened.

VIII. Theſe Methods are to be followed till the *Bubo* comes either to a Diſperſion or Maturation. When the Tumor appears to be perfectly ſuppurated, the Scalpel is to be taken in hand, in order to make an Inciſion upon the *Bubo*: But then it muſt be done with Caution, to avoid hurting any of the large Blood-veſſels in either the *Inguen* or *Axilla*; from whence might enſue a very dangerous Hæmorrhage. The better to avoid injuring theſe Veſſels, the protuberant Part of the *Bubo* ſhould be preſſed outwards by the Fingers. But with regard to the Time in which it is proper to make the Inciſion, it muſt be always carefully obſerved not to let it be too ſoon nor too late: Becauſe both are dangerous: For when they are opened too ſoon, it occaſions Pains, violent Inflammation, and other bad Symptoms: As when they are delayed too late, it generally occaſions (as HILDANUS witneſſes) the corrupt Matter to return into the Blood, and by infecting the whole Maſs, brings on a confirmed *Lues*. If the Patient dreads the Knife, the *Bubo* may then be opened by a Cauſtic. Here the Reader ſhould turn to what we have ſaid before on Abſceſſes, *Chap.* III. § X, *ſeq.* When the Matter is once diſcharged, it will be proper to cleanſe the Ulcer with ſome digeſtive Ointment, mixed with ſome *Theriaca* and a little *Merc. Præcip. Rub.* Afterwards may be applied a Plaſter of *Diachylum cum Gummis*; by which means the Lips of the *Bubo* will be ſufficiently ſoftened and cleanſed: And then it may be healed with ſome vulnerary Balſam, applied on ſcraped Lint.

Whether and when the actual Cautery ſhould be uſed.

IX. Sometimes the ulcerated *Bubo* becomes ſo ſtubborn, that it will neither incarn nor cicatrize, by the Help of any Medicines; but always affords a copious Diſcharge of Matter. When this is the Caſe, and the forementioned Medicines have been uſed to no Purpoſe, *viz. Præcip. Rub. & Alum uſt.* prove alſo to be of no Service, there then remains no other probable Method, in my Opinion, than to cauterize the corrupted Parts to the quick by the actual Cautery. For by that means the Communication of the infected Lymphatics may be cut off. From what we have hitherto propoſed, it ſeems to be ſufficiently apparent, that it is always ſafer and more convenient to bring Venereal *Bubos* to a ſpeedy Diſperſion or Reſolution, when a Cure may be that way effected, than to bring them ſlowly to a Suppuration. But when the Blood is found too much infected, and already corrupted by the venereal Venom, ſo that a confirmed *Lues* begins to ſhew itſelf, the Cure by Suppuration may be then both proper and requiſite.

CHAP. XIII.

Of CHILBLAINS.

Chilblains, what they are.

I. WE generally give the Name of *Chilblains* to thoſe Tumors which happen in the Hands and Feet from violent Cold; they being at the ſame time accompanied with Inflammation, Heat, Redneſs, pricking Pain and Im-

Immobility in that Limb. Sometimes they are of a livid or leaden Colour, and ſometimes they break out with Scabs or elſe with Chaps or Slits, which afterwards penetrate deeper, and become ulcerous. The Humour which they diſcharge is ſometimes a little fœtid, and pretty much reſembles *Pus* or *Sanies*. The Inflammation alſo frequently turns to a *Sphacelus*. So that I think we may readily conclude hence, that Chilblains wholly belong and ought to be referred to the Tribe of Inflammations: The more becauſe they excite the ſame Senſe of Heat or Burning with other Inflammations [a], and do, like them, terminate in either Diſperſion, Suppuration, Gangrene and *Sphacelus*.

II. Chilblains may be known and diſcovered by ſeveral Means: For (1.) We may obſerve the common Signs of Inflammation which we have but juſt now mentioned: (2.) We muſt enquire whether the Patient afflicted with them has been ever previouſly affected in thoſe Limbs with vehement Cold or Froſts; to which Travellers and Soldiers, who are engaged in Winter Expeditions and Sieges, are often greatly expoſed. Laſtly, (3.) It is alſo a Sign that they are Chilblains, when the Patient feels Pricklings or Shooting in the Part, with Heat and violent Itching; and when the Part affected is found inflexible and almoſt inſenſible. *Diagnoſis.*

III. While the Chilblains are yet tumified and red, and the Part retains its Senſe and Motion without any great Heat and Pain remaining, the Diſorder is then of the mildeſt Kind. On the contrary, when they turn livid, occaſion the Limb to become ſtiff and inſenſible, or excite pricking Pains therein; there is then Danger of a worſe Conſequence, leſt it ſhould degenerate into a Gangrene, or, at leaſt, a deep Exulceration. When the Skin riſes into Puſtules or Bliſters, like what frequently happens in Burns and violent Scalds, it is a Sign that there is an incipient Gangrene upon the Part. Laſtly, when the Member loſes its Senſibility, turns livid, ſoft, and flaccid, there is great Reaſon to ſuſpect that it is then dead, and ſphacelated. The Degrees of this Diſorder.

IV. We have no room to doubt but that the real Cauſe of Chilblains is the Cold. For by violent Cold, the Mouths of the ſmall Blood Veſſels are not only greatly contracted, but the Blood is alſo by the ſame Means rendered too thick; which are the two great Cauſes of all Inflammation. Nor is there any Symptom that attends this Diſorder, but what may be readily explained as a Conſequence of theſe Cauſes. Cauſe.

V. Though Naturaliſts are not yet well agreed among themſelves concerning the true Nature of Cold, yet I cannot conſent to the Opinion of thoſe who look upon Cold to be only the Effect of a Privation or Abſenſe of Heat. But I rather judge it to conſiſt in [b] certain hard, ſharp, rigid, and ſaline Particles, which float in the Air: Which are by the Preſence of Heat, rendered very minute, ſoft, flexible, and volatile; but upon the Approach of Cold, they coaleſce and become rigid. Now when theſe Particles inſinuate themſelves into the ſmall Pores of the Body, they conſtringe the ſmall Veſſels, and by wounding them, either inſpiſſate or ſtop the Blood. Hence (in my Judgment) we may perceive the Reaſon why the Cold ſlits or cleaves the Skin of the Face, Lips, and The Nature of Cold.

[a] So TACITUS very elegantly, *Annal.* xiii. *cap.* 15. Many of the Men, upon the Watch, had their Limbs quite *burnt* with the Extremity of the Cold.

[b] *V.* HAMBERGERI *Diſſ. de Frigore.*

other

other external Parts, and afterwards afflicts them with continual prickings and ſhootings. For the leſs Motion and Heat the Blood has in any Part, it is the more apt to be inſpiſſated generally. So that it is no Wonder if the Hands, Feet, Heels, Fingers, Toes, Noſe, Ears, *&c.* are more frequently afflicted with Chilblains than any other Parts of the Body; being ſometimes ſlight, but often very violent. Sometimes the Cold is ſo great as to quite ſtop the Courſe of the Blood throughout the whole Body; which then quickly kills the Patient: And we ſay commonly, that he was froz n to Death, or periſhed with Cold.

Prognoſis. VI. Though all Chilblains are in the general ſomewhat dangerous, yet they are more or leſs ſo in Proportion to the Extremity and Violence of the Cold which occaſions them: In Conſequence whereof, more or leſs grievous Symptoms ariſe. When the whole Hand or Foot is ſeized by the Cold, the Danger is generally greater than when it affects only a Finger or Toe. But nothing can be more fatiguing, than that thoſe who have once been afflicted with Chilblains ſhould afterwards become liable, almoſt every Year, to Inflammations, Pains, Ulceration, and even Gangrene, upon the Approach of any great Froſt. Laſtly, when Chilblains are ill-treated, by ſuddenly expoſing the Part from the Cold to a Fire, or any thing hot, or by wrapping it up in hot Things, there is great Danger of the Parts becoming black, ſoft, and putrid: And at length, loſing all its Senſation, it may contract a *Spachelus.*

External Treatment. VII. Having found this to be the State of the Caſe, it readily follows, that the Cure of all Chilblains muſt conſiſt chiefly in reſtoring the Blood to its former Fluidity and free Circulation as ſoon as poſſible. But the inſpiſſated Blood requires to be reſolved in this Caſe by Methods very different from thoſe generally uſed in other Inflammations. For the warm Medicines, which are very beneficial and even abſolutely neceſſary in other Inflammations, are found to be extremely pernicious for Chilblains. Nor can it ever be ſafe for thoſe who have ſuffered extreme Cold to expoſe themſelves preſently to Heat or a Fire: For Death has been often the Conſequence of ſuddenly expoſing the Body to the Viciſſitudes of Heat and Cold. It is therefore much more ſafe and convenient to expoſe the Patient firſt to an Air that is either cool or temperate, and to order him to continually exerciſe his Limbs as much as he poſſibly can; and laſtly, to advance him gradually to a ſtill greater Warmth or Heat. When the Patient is too weak to exerciſe himſelf, it will firſt be proper to bathe the Parts affected with Snow, or cold Water, which will ſeem to be hot to the Patient: By which means the ſharp ſaline *Spicula*, which ſtick in the Pores of the Skin, will be drawn out, and the Blood reſtored to its natural Circulation. Afterwards, when the Limb is become ſenſible, we may, by Degrees, apply comforting Medicines; ſuch as *Sp. Vini, meri vel cum Theriaca, Oleum item Petræ, Balſ. Sulph. &c.* When the Parts affected have been well rubbed and bathed with theſe, the Patient may then be advanced towards the Fire, or be put to Bed; endeavouring afterwards to excite a gentle Sweat.

Internal Treatment. VIII. To anſwer this Intention, great Service will be had from a few Glaſſes of hot Wine, wherein has been boiled ſome Cinnamon and Sugar. For by drinking, or rather gradually ſupping of this, the Patient generally revives and grows warm, and the Blood recovers its Circulation. Though it may not be improper to give alternately with this, a ſmall Quantity of a ſudorific Mixture: As,

℞. *Aq.*

℞. *Aq. Galeg. Rutæ, Scord. ana* ℥ ij. *Theriacal. Vit. Matthiol. ana* ʒ vj. *Prophylact. Sylv.* ℥ *ss. Mixtur. Simpl. vel Tinct. Bezoard.* ℈ ij. *Syrup. Cinamom. Caryophillor. ana* ℥ *ss. Misc.*

A little Draught of this, about three Spoons full, ſhould be given to the Patient every Quarter of an Hour, and the hot Wine as often, till we find the Appearance of a Sweat. If Wine be not at hand, good Ale boiled with Cinnamon, Cloves, and Sugar, may well enough ſupply its Place. Such Suppings as theſe ſhould be continued ſo as to keep up a Sweat for an Hour, or leſs, according to the ſeveral Circumſtances. For it can ſcarce be imagined how certain and expeditious this Method of Cure is for the moſt grievous Chilblains, which even threaten a Gangrene. But if the Diſorders which proceed from Cold are much ſlighter, this Method is then not ſo directly neceſſary, but may be laid aſide, though it is much preferable to any other.

How a Suppuration or Gangrene is to be treated.

IX. When Chilblains tend to Suppuration, it is proper to treat them like other recent Abſceſſes. Firſt, to cleanſe the Wound with ſome digeſtive Ointment, as *Ægyptiacum, &c.* then to dreſs it with *Ol. Ovor. Ceræ, &c. vel Balſ. Peruvian. Eſſent. Aloës, Myrrhæ, &c.* and laſtly, to apply *Emplaſt. Saturnin. vel de Lithargyro.* Sometimes we ſhall find Benefit from *Oleum Myrrhæ per Deliquium*; as alſo from *Mures aduſti*, if we may believe the *Ephemerides Naturæ curioſorum.* Laſtly a Mixture of *Aq. Calcis cum Sp. Vin. Camph.* will be frequently found of great Service here; or *Rapæ cocta*, which many Writers recommend; particularly CELSUS, *L.* V. *C.* 38. And PLINY, *L.* XX. *C.* 3. if a Compreſs dipped therein be bound upon the Part, either alone, or after the Application of the forementioned Medicines. But if a Gangrene or *Sphacelus* appear, the Parts affected are then to be treated in the Method we ſhall propoſe in the following Chapter.

To prevent Chilblains.

X. If a Patient has before been troubled with Chilblains, which are uſed to return every Year, in the Winter; to prevent the Diſorder from returning again, he may arm himſelf by proper Medicines. The beſt Preſervative for this Purpoſe, is, to anoint the Parts affected with *Petroleum* or Oil of Turpentine, before and while the Severity of the Winter comes on: But when the Diſorder has begun to ſhew itſelf again by Tumor, Inflammation, and Pain, the diſordered Heel or Finger may be wrapped up in a Swine's Bladder, dipped in the forementioned Oils. But the Cold itſelf ſhould be always carefully avoided, by defending himſelf well with proper Cloths or Coverings. The Reader may conſult at his Pleaſure M. A. SEVERINI *Diſſert. de Pernionibus in Lib. de Abſceſſibus.*

CHAP. XIV.

Of a GANGRENE *and* SPHACELUS.

What a Gangrene and *Sphacelus* are.

I. HITHERTO I think we have ſufficiently conſidered the *Exit* of an Inflammation by the Way of Diſperſion or Suppuration. It follows, that we now examine the third and laſt Method wherein an Inflammation terminates, *viz.* a Gangrene and *Sphacelus*, to which Diſorders the antient Phyſicians

Phyſicians gave the Name of *Cancrum*[a]. By a *Gangrene* we underſtand that moſt great and dangerous Degree of Inflammation wherein the Parts affected begin to corrupt and put on a State of Putrefaction. But by a *Sphacelus* we underſtand not an incipient, but an abſolute and perfect Corruption, or Death of the Parts.

The Signs. II. A Gangrene may be diſcovered generally from the following Signs: Namely, the Inflammation, with its Symptoms, which have all along been very violent, do generally undergo a ſudden Change, as if they were going off. The Parts which were before ſwelled and tenſe, do now become ſoft and flaccid; and upon preſſing with the Finger upon the Skin and Fat, its Impreſſion remains behind, as in an *Œdema:* At length the *Cuticula* ſeparates from the *Cutis*, often riſing up in Bliſters like thoſe in Burns, filled with a reddiſh, yellowiſh, and ſometimes black Humour; and the Senſe of the Limb is, in ſome Degree, diminiſhed. The chief Mark whereby we diſcover a *Sphacelus* is, when after a previous Gangrene the Parts turn livid, and entirely loſe their Senſation, in ſuch a Manner, that the Fleſh may be pricked and cut without giving any Pain: And if the Gangrene penetrates deep, ſo as to affect the Nerves and Muſcles, the Limb alſo loſes its Power of Motion. Afterwards the Colour of the Part turns black by degrees, and the Skin feels cold and flaccid: And at length it adheres ſo looſely to the Fleſh, that it may be eaſily pulled up and off from it. Sometimes the Skin becomes hard and dry, like the Rind of Bacon. Laſtly, it yields a moſt intolerable cadaverous Stench, and the *Sphacelus* ſpreads by degrees through the adjacent ſound Parts; unleſs there ſhould happen to be a Separation of the dead Parts from the ſound: Though it frequently ſtops of itſelf, and by forming a circular Suppuration, the mortified Parts are caſt off from the ſound. I have ſeen ſome Caſes, where from vitiated Humours a Bladder has ariſen, without any previous Symptoms, ſometimes of a larger, ſometimes a leſs Size, chiefly in the Feet, more generally in the Toes: Which Bladder was full of Water or *Serum*, and ſpread itſelf gradually, blackening and mortifying the Fleſh underneath, as in peſtilential Carbuncles. There have been other Inſtances, where the Toes of a ſudden have turned firſt livid, then black, with an utter Privation of Senſe and Motion: Nor could any Inciſion draw Blood from the Part.

Cauſes. III. The *Cauſes* of a *Gangrene* and *Sphacelus* are either external or internal. Among the *internal Cauſes* we reckon an *Eryſipelas*, and all other Inflammations which ariſe ſpontaneouſly, and can by no means be diſperſed nor brought to Suppuration. Inflammations of this Kind uſually proceed from the Blood's being too acrimonious or corrupted by the Bile, or in a *Scorbutus:* Or when the Circulation of the Blood is too quick or too ſlow, by reaſon of old Age or any other Weakneſs; or laſtly, when the Patient indulges himſelf in a bad Courſe of Life, with reſpect to his Diet, or is ſubject to violent Paſſions, (eſpecially Anger, Grief, and Fear,) during the Time of the Inflammation. By *external Cauſes* we mean Injuries from the Air, cold Water, and the Application of topical Remedies externally to the inflamed Parts, which are either cooling, aſtringent, fat, oily, or the like; together with all great external Hurts or Accidents

[a] Vid. CELSUS, *Lib.* V. *Cap.* XXVI. *N.* 31, 34.

which

which frequently happen to the Body through Falls, Blows, *&c.* as in Wounds, Fractures, Luxations, *&c.*

IV. A Gangrene is for the Generality, never without Danger; becauſe it easily changes into a *Sphacelus* or entire Mortification, which never admits of a Cure but by taking off the dead Parts. But a Gangrene which is ſlight, incipient, and not ſpread far, but only affects the Skin and Fat, is not very difficult to cure; eſpecially when it happens in a young and ſtout Patient, in a mild and temperate Seaſon, and does little or no Injury to the Muſcles and Nerves[a]. But the larger, more violent and confirmed is the Gangrene, and the faſter it ſpreads, the more difficult is it generally to effect a Cure; eſpecially in an old or weak Patient[b], or in an ill Habit of Body from a Dropſy, *Phthiſis*, or *Scorbutus*. The Weather alſo being too hot or very cold, or the Parts affected being near the *Thorax* or *Abdomen* may make the Caſe more dangerous. Nor can this Caſe be neglected without the utmoſt Danger of Life: For the putrid Matter being abſorbed by the ſmall Veins, and mixed with their Blood, is conveyed to the Heart and Brain, and corrupts the whole Maſs; from whence all the vital Actions are diſturbed, the Appetite goes off, and Phrenzy with Death follow. So alſo in large inveterate Ulcers, in the Extremities and Feet of old People, when they become dry and livid, it is almoſt a conſtant Sign that a *Sphacelus* and Death are at hand. Death is alſo preſaged in great Inflammations attended with Spaſms, continual Hiccoughs and Belchings, cold Sweats, Faintings, a *Delirium*, and continual Reſtleſſneſs or Drowſineſs, eſpecially if they happen in a Patient who is then afflicted with a Gangrene or *Sphacelus*. And laſtly, if the Gangrene be not directly treated with proper Medicines, it commonly turns ſuddenly into a *Sphacelus*; and if the ſphacelated Parts are not timely removed or amputated, the Diſorder ſpreads through the adjacent Parts, and brings on a ſpeedy Death. But in a *Sphacelus* from an internal Cauſe, and eſpecially at the Verge of Life, the Amputation of a Limb is generally ineffectual: For either the Patient thro' extreme Weakneſs dies ſhortly after; or from a bad Habit of Body the Mortification ſeizes ſome other Part, and ſoon terminates in Death. *Prognoſis.*

V. We muſt therefore always endeavour to treat the Gangrene ſo as that it may not terminate in a *Sphacelus*. Firſt of all therefore, in plethoric and ſtrong Habits, we are to bleed largely, and to repeat the Operation at Diſcretion; but in weak Habits, it ſhould be omitted. The Remainder of the Treatment will conſiſt chiefly in obſerving the three following Directions: The Cure conſiſts in three Things.

(1.) *To be careful in the Beginning to remove all violent external Cauſes of the Inflammation:* As too ſtrict a Bandage in Wounds and Fractures, all foreign Bodies which are ſtuck in the Parts, as Thorns, Splinters, Needles, *&c.* improper Medicines externally applied, as Ointments, Oils, and Plaſters with cooling and aſtringing Things, as we before obſerved: All which ſhould be removed as ſoon as poſſible. (1.) A Removal of the external Cauſes.

VI. (2.) The other Obſervation reſpects chiefly the *keeping up of the Patient's Strength*, eſpecially in weak and old People. This may be beſt effected by ordering a Diet which not only affords good Juices, but is alſo well accommo- (2.) A proper Diet and internal Medicines.

[a] See CELSUS, *De Medic. Lib.* VI. *Cap.* 26. § 34.

[b] New Inſtances may be ſeen of Death from a Gangrene in old People in LE DRAN's *Obſ.* 100 & 101. I have alſo been Eye-witneſs to many of the like Caſes.

dated to the Age, Conſtitution, and other Circumſtances of the Patient. If the Patient is weak and in Years, is naturally of a cold Habit, has loſt much Blood, or abounds with Acidities, the moſt ſuitable Diet will be Soops, and ſtrengthening Broths, ſuch as are made of Chicken or Capons, Beef, or ſome other good Fleſh, boiled with Mace, Ginger, or other Spices: As alſo Suppings of Ale boiled with the Yolks of Eggs, Cinnamon, and Sugar; Eggs themſelves poached ſoft, ſo as to be potable; ſtrong Gellies of Calves Feet, Hartshorn, and Ivory Shavings; old and rich Wines, as *Rheniſh*, *Hungarian*, *Spaniſh*, *Canaries*, &c. and laſtly, fine Ale may do very well, eſpecially for the Poor. With reſpect to Medicines, the moſt proper are the *Corroborantia*, uſually termed *Cordial*, as the Spirits, Eſſences, Powders, and Electaries of that Tribe, eſpecially made up or mixed with *Confect. Alkermes*. At Intervals may be drank hot, Tea of Sage, *Scordium Veronica*, and Herbs of the like Nature, with the Addition of a little Cinnamon, or a few Shavings of *Leign. Saſſafræ Santal. Citrin.* &c. For by theſe means the ſtagnating Blood will be wonderfully reſolved and attenuated, its ſound and healthy Parts will be retained in a due Circulation, and its noxious Parts will be diſcharged and diſſipated. It is alſo not improper in this Caſe, frequently to apply a Sponge to the Noſe or Carpal Arteries, which has been dipped in *Aq. Regin. Hungar.* alſo to bind it upon the Temples. In like Manner we ſhall find almoſt equal Benefit from the Crumb of Rye Bread mixed up with powdered Cloves; if it be firſt macerated in very ſtrong Vinegar, or *Hungary* Water, then made into a globular Form, wrapped up in a Piece of Linen Cloth, and frequently applied to the Noſe. For Patients who are of a more warm, ſanguine, or bilious Habit, Soops and Piſans mixed with the acid Juice of Citrons or Lemons will be very proper Strengtheners; alſo Barley Gruel mixed with *Syr. Mali Citrei vel Mori, vel Rubi Idæi, vel Ribeſiorum aut Ceraſorum acidor.* to be taken daily as a common Drink. When the Heat is ſmall, the Patient weak, or before accuſtomed to Wine, it may be allowable to mix a little Wine with the Gruel, eſpecially *Rheniſh*, and ſometimes a Glaſs of rich Wine may be taken unmixed at proper Intervals; at the ſame time not neglecting the other Medicines which are proper to be uſed in Fevers, ſuch as are mild, temperating, cooling, and cordial. But the *Cortex Peruvianus*[a] is by many celebrated in this Diſorder beyond any other internal Medicines; they look upon it as the only Medicine in this Caſe, and adminiſter it in the ſame Manner as in Intermitting Fevers. I have myſelf ſeen the good Effects of this Medicine: Though indeed it has failed in ſome Caſes, which proceeded from an internal Cauſe, and where the Patient was advanced in Years. See *Act. Acad. Nat. Curioſ.* Vol II.

(3.) External Remedies.

VII. 3. The third and laſt Obſervation concerning the Treatment of a Gangrene is chiefly *to diſcharge the ſtagnating and corrupted Blood from the Parts affected, as ſoon as poſſible*, and to prevent the neighbouring Parts from being affected thereby. The principal Means to effect this, are (1.) to make uſe of proper internal *Corroborantia*, or ſtrengthening Medicines; (2.) to make *Scarifications (pro re nata)* by the Scalpel upon the Parts affected, making the Inci-

[a] Conſult WERLHEFFII *Obſ. de Febrib. p.* 332. taken from the Obſervations of RUSHWORTH, AMIAND and DOUGLAS. See alſo a particular Treatiſe publiſhed by DOUGLAS on Mortifications.

ſions

ſions very numerous lengthways upon the Parts, and of a ſufficient Depth, in order to diſcharge the ſtagnating and corrupted Blood, and to make way for the Ingreſs of the Virtues of the diſcutient Medicines which are applied externally; by which means they can the better penetrate through the ſmall Wounds to the internal Parts. Laſtly, (3.) diſcutient, ſtimulating, and balſamic *Fomentations* and *Cataplaſms* which reſiſt Putrefaction, are to be carefully applied to the diſordered Parts: Of which Kind is the following Fomentation:

℞. *Aquæ Calc. viv.* ℔ j. *Sp. Vin. Camph.* ℥ iij. *Sal. Ammoniac.* ℥ ß. *M.*

This may be applied hot with Compreſſes, it being what I have very frequently experienced and ſtill continue to uſe with very good Succeſs in theſe Caſes, and in other Inflammations. A very extraordinary and uſeful Mixture is alſo made *ex Aq. Calc.* ℔ j. *cum Mercur. Dulc.* ℥ j. to be applied like the other. In the Hoſpital at *Amſterdam* the following excellent Fomentation was uſed with Succeſs in Gangrenes, within my Remembrance[a]:

℞. *Spirit. Vini* ℥ iij. *Pulv. Aloës, Myrrh. ana* ℥ ß. *Ung. Ægyptiac.* ℥ ij. *M.*

Or, *Sp. Vin. cum Aloë, Myrrha, & Croco leniter coctus; vel Sp. Vin. Camph. cum Theriaca mixtus; vel Sp. Theriacalis aut Matricalis cum ſexta quaſi parte Elix. Proprietat. roboratus*; or, what GARENGEOT greatly extols, *Vinum calidum, Sp. Vin. ſimplic. vel Camphora roboratum, vel Sp. Vin. Camph. Sale Ammoniaco acuat.* which he extols as an excellent Remedy to revivify Parts which ſeem to be dying[b]. Or,

℞. *Fol. Scord. Abrotan. Abſinth. Rut. recent. ana M.* ij. *Flor. Chamæmel. M* j. *coq. in ſ. q. Aq. ſimpl. colatur.*
℞. *Hujus* ℔ ij. *adde Spirit. Vin. Theriacal.* ℥ iv. *Sapon. Venet.* ℥ ij. *Salis Gemmæ* ℥ ß. *M. f. Fomentum.*

This Fomentation is to be applied hot ſeveral Times in a Day to the Parts affected, by means of Linen or Woollen Cloths: And to give a laſting Warmth, we may apply a hot Tile wrapped up in a thick Cloth, or a hot Bag of Sand.

VIII. For the Poor in this Caſe, there is a cheap and domeſtic Remedy, but of great Efficacy, recommended by SIMON PAULUS and others, *viz.* the *Pickle of Cabbages*. VALESIUS DE TARANTA has long before taught us, that Horſe or Cow-dung boiled in Vinegar or Wine, makes an excellent Fomentation for this Purpoſe. But a long Time after him, we are told that SYLVIUS and BARBET held the ſame Remedy as a Secret in this Diſeaſe: But the Filthineſs of the Medicine makes it unworthy a Phyſician, it being fitter for the Poor and Vulgar than People of Faſhion. But there is a neat, as well as a very efficacious, Fomentation for a Gangrene, to be made of *Scordium*, Wormwood, and Southernwood, either ſeparate or mixed, to be boiled in Sea-water, or, where that is not to be had, Salt-water or Vinegar, to be applied hot like other Fomentations ſeveral Times in a Day, giving a laſting Warmth by hot Bricks or Tiles, till the Diſorder diſperſes or diminiſhes. Thus there will be no Occaſion to ſo frequently unbind the Part, and expoſe it to the Air, to apply more of the warm

A domeſtic Remedy for the Poor.

[a] Vid. KOENERDING *in Libello de Gangræna & Sphacelo, Belgico Sermone edito, Amſt.* 1698, 8vo.
[b] *Chirurgical Operations*, in the Chapter of a *Gangrene*.

Fomentation: But it is sufficient, nay even preferable, to soak the Compresses well in the Fomentation, and to keep them hot upon the Parts by the forementioned Contrivance [a].

An obstinate Gangrene, how to be treated.

IX. But the more obstinate and nearer we find a Gangrene is to a *Sphacelus*, the more potent Remedies are we obliged to make use of. Such principally are the very numerous, long, and deep Incisions and Scarifications of the Parts affected down to those which are sound. The Incisions are also made not only longitudinally, but also transversly, where they may be so with Safety, as in the Arm, Leg, and Thigh: By which means the Humours which lodge in the membranous Coverings of the Muscles may be the better discharged, and the Tension of the Membranes taken off, and such as stop the Motion of the Fluids by their Stricture be relaxed. Afterwards the injured Parts are to be well rubbed and soaked with the stimulating, discutient, and balsamic Medicines at § VII; to which may be added the Oil of Cloves, or Spirit of Turpentine, both powerful Remedies in this Case. Then is to be applied a penetrating and discutient Cataplasm, that the Blood in the vitiated Parts may be restored as much as possible to its free Motion. The following may serve for a Cataplsm of this Kind:

℞. *Herb. Scord. Malv. Absinth. Matricar. ana* M ij. *Menth. Abrotan. ana* M j. *Coquantur in s. q. Oxycrati, vase clauso, ad consistentiam Cataplasmatis sive Pultis, eique postea admisce Salis Ammoniaci* ʒ ß. *Farin. Lin.* ʒ ij. *Ol. infus. Rut. vel Chamæmel.* ʒ ß. *M. f. Cataplasma.*

Always before the Cataplasm is applied to the Part, it should be mixed with some *Sp. Vin. Camph. aut Theriac.* to increase its Virtue. Or instead of this Cataplasm, we may use the following, recommended by the forecited KOENERDINGIUS [b].

℞. *Mic. Pan. Alb.* ℔ j. *Pulv. Absinth. Scord. Rutæ ana* M j. *Vini q. s. ad consist. Cataplasmatis, post levem ebullitionem adde Sp. Vini* ʒ iv.

This is to be applied warm. In the mean time, it is a necessary Caution to be observed in the Application of Fomentations and Cataplasms, *viz.* that they should not be renewed too often, but only two or three Times in a Day: For Experience has taught us, that the Humours may by that means be dispersed and attenuated sooner and with more Ease than by uncovering the affected Parts every Hour, as is customary [c]. But we must also carefully observe, that Cataplasms and Fomentations should not only be as warm as possible when they are first applied, but are also to be kept warm all the while upon the Parts, by covering them with hot Cloths, Tiles, or a Bag of Sand: By which means they

[a] HARRIS *(in Diss. Chirurg.* II.) advises, that, where an Inflammation is just turning to a Gangrene, the Part affected should be dipped, if possible, in red Wine made hot, and fomented with the same.

[b] *In Libello de Gangræna, supra citato.*

[c] GARENGEOT will have the Dressing not to be opened above once in the Space of four and twenty Hours, in this Disease, (in his *Operations*, Chapter of a *Gangrene.*) But because the Parts affected may suffer great Alterations in that Time, and as the Virtue of Medicines will scarce last so long, I think it more adviseable for the Surgeon to inspect the Parts two or three Times in a Day, that he may renew the Medicines, know how it goes forward, and what is to be further done, and that he may prevent any bad Accident.

will

will penetrate, ſtimulate, move, and attenuate much better; for if they become cold, they prove not only uſeleſs, but very pernicious. All Things well conſidered, we can hardly affirm, that we have any thing that will cure a Gangrene, or prevent a *Sphacelus*; but if the *Cortex Peruvianus* has the Effects attributed to it in this Diſeaſe, we need not be troubled with ſuch a Train of ineffectual Remedies, nor charge our Heads with ſo many irkſome Cautions and Obſervations thereon [a].

How a Sphacelus is to be treated.

X. But if the Parts are already become quite dead, ſo as to be entirely without Senſe, and ſoft, ſo as to retain the Impreſſions of one's Fingers Ends, and appear to be fœtid and corrupted; in that Caſe, all the Medicines in the World will be inſufficient to reſtore the Parts to Life again. But there remains one, though a miſerable Remedy, to preſerve the reſt of the Body, by amputating the dead Parts that the Diſeaſe may not ſpread through the reſt which are ſound. But a different Courſe muſt be taken in this Amputation, according to the Degree of Corruption, and the particular Nature of the Parts ſo affected. For if only ſome Extremity of the Foot, *Tarſus*, *Metatarſus*, Ancle, or Inſtep, or only the bare Skin and Fat are ſphacelated, the whole Member or Foot ought not in that Caſe to be amputated; but preſerving the Limb entire, we are to remove only that Part which we find vitiated, and that, in my Opinion, by means of Suppuration, as we taught in *Chap.* XI. § VI. *ſeq. Of Peſtilential Carbuncles*, or elſe to be taken off by cauſtic Medicines. Thoſe who undertake the Cure of a *Sphacelus* by *Suppuration*, are to take three Things chiefly into Conſideration: (1.) To effect the Suppuration as ſoon as poſſible; then (2.) to remove the dead Cruſt or Eſchar of the Ulcer, and ſeparate it from what is ſound; and (3.) to cleanſe the Ulcer, to preſerve the ſound Part, *&c.* and heal the Wound.

A Suppuration, how to be promoted.

XI. To expedite and quicken the Suppuration, nothing equals the making long and deep Scarifications or Inciſions, eſpecially near the ſound Parts. For by making innumerable Inciſions ſo deep, till we find that we every way touch the ſenſible Parts, ſo as to excite Pain, the noxious Matter lodged under the Eſchars, may thereby be more eaſily diſcharged, proper Medicines will more readily penetrate the Parts, and the dead Parts will, by that means, be more ſpeedily ſuppurated and the ſooner ſeparate from the ſound. But the moſt efficacious Medicines to promote this Separation of the vitiated Parts from the ſound, are Emollients and Balſamics which reſiſt Putrefaction, uſed in the following Method: *viz.* The inciſed Parts are to be firſt well anointed with *Unguent. Digeſtivum*, and then to be carefully treated with the balſamic Cataplaſms and Fomentations. To this Place belongs the following Fomentation, beſides thoſe mentioned, § VII, VIII, IX.

℞. *Decocti Hordei vel Scordii* ℔ j. *Acet. Rutac.* ℥ vj. *Spir. Vin. Theriacal.* ℥ iv. *Sal. Marin. aut Vulgar.* ℥ j. *vel* ij. *Miſc.*

[a] I made Trial of the *Cortex* lately upon a corpulent female Patient of near ſixty, who was afflicted with a Gangrene from an internal Cauſe, about the lower Part of the *Tibia*, *Tarſus*, and *Metatarſus*, wherein the common Integuments of the Body were already ſphacelated and corrupted. But ſhe always threw up the Remedy by Vomit, ſoon after every time ſhe took it, as ſhe had likewiſe done other Medicines for ſome time before; ſo that I was obliged to lay it aſide. But after many other Things tried in vain, I at length reſtrained her Vomiting by the *Pyrmont Waters*, drank cold (for ſhe threw them up when warm) and performed the reſt of the Cure by the Medicines hereafter recommended for the Cure of a *Sphacelus*. Whence it appears, that all Gangrenes and *Sphaceli* from internal Cauſes are not incurable, as ſome Authors have aſſerted.

This

This is to be applied hot with Compreſſes to the inciſed Parts, and frequently repeated, till the Diſorder appears to ſpread no further. We know the *Sphacelus* ceaſes to ſpread, when the Tumor of the vitiated Parts ſubſide, and the Lips of the adjacent ſound Parts become tumid all round: And on the ſecond or third Day after, a Suppuration is gradually formed, and the ſound Parts ſeparate from the vitiated. But to ſoften and promote a ſpeedy Separation of the Eſchar afterwards, the following Cataplaſm will be found very ſerviceable:

℞. *Folior. Scordii M.* ij. *Malvæ Hyoſciam. Alth. ana M.* j. *Flor. Lavendul. M.* ſ. *coquantur cum Aceto vel Oxycrato ad conſiſtentiam Cataplaſmatis, cui tandem admiſce Farin. Lin.* ℥iij. *Ol. Lin.* ℥j. *Sal. Ammoniac.* ℥ij. *F. Cataplaſma.*

This is to be applied warm over the whole, and it is to be retained in that Condition of Heat as long as requiſite, by the Means beforementioned at § VII, IX. This will wonderfully promote the Separation of the vitiated Parts from the ſound; eſpecially if the Bark be taken inwardly at the ſame time. We read in the *Acta Edinburg.* that a *Sphacelus* is often ſtopped, and the Ulcer healed by the Uſe of the Bark inwardly, and the external Application of the Spirit of Turpentine only. This Spirit has long ſince been much extolled by HARRIS, and I myſelf have found it extremely ſerviceable.

The Separation and Cleanſing of the Parts how to be effected.

XII. After theſe Medicines have been uſed, and when the whole ſurrounding Skin is gently tumified, with Redneſs, a Cruſt or Eſchar is formed by Degrees, and the ſound Fleſh begins to ſeparate from the reſt: This is then a Sign that the Diſorder has done ſpreading, and that an entire Separation of the vitiated Parts will ſhortly follow. Therefore whenever this Separation ſhews itſelf, it ſhould be promoted as much as poſſible, by the Uſe of ſome ſuppurating Ointment, ſuch as is commonly termed digeſtive: Which may be applied either alone or mixed with ſome *Theriaca*; to be retained on between the ſound and dead Parts, (which may be ſometimes a little divided by the Lancet) after which the preceding Cataplaſm ſhould be applied. But in all future Dreſſings, whatever of the dead Parts is found looſe, or ſeparated, ſhould be removed every Day: Or, if any of the vitiated Parts ſhould in ſome meaſure adhere to the ſound, they may be ſeparated by the Sciſſors or Scalpel, without any great Pain or Danger. After this, it will be proper to remove the Cataplaſm, and apply ſome digeſtive Ointment, or *Empl. Diachyl. vel Saturnin.* in the room thereof, till the corrupted Parts are entirely caſt off, and the Ulcer appears to be well cleanſed. The Separation of the corrupted Parts from the ſound, may be wonderfully promoted by keeping the diſordered Limb in a conſtant Warmth, by Cataplaſms covered with hot Bricks or Tiles, to retain the Heat and avoid the frequent uncovering of the Parts to apply freſh Cataplaſms. When the ſound Parts are ſufficiently deterged or cleanſed, we muſt then proceed to their Agglutination or Cure: In order to which we ſhall find great Benefit from *Ung. Digeſtiv. vel Baſilicum, vel Balſ. Arcæi*, together with the forementioned Plaſters.

Cauſtics, which and how to be applied.

XIII. But there are many Surgeons, who, to avoid the Length of Time which is uſually taken up in forming a Suppuration, and for ſome other Reaſons, have Recourſe directly to *cauſtic Medicines* in this State of their Diſorder. Their Method of Treatment is this: They anoint the Lips only, or elſe the whole, of the corrupted Parts every Day with *Butyr. Antimon.* or *Lap. Cauſt. liquefact.* till the

the living Parts are ſurrounded by a Sort of Eſchar: And always afterwards they apply the forementioned (§ IX and XI.) Fomentations and Cataplaſms; in order to prevent the Diſorder from ſpreading, and to make the corrupted Fleſh ſeparate from the ſound. To this Place belongs the *Aqua Phagedænica* and the *Lixivium rodens* BOERHAAVII *in Mater. Med.* § 462:

℞. *Calc. viv. fortiſſ.* ℥iij. *Ciner. Clavellator.* ℥ix.

Theſe are to be firſt ground ſeparately, and to be afterwards mixed together, adding a little Water; then let them be put in a Glaſs, and ſtand in a moiſt Cellar to diſſolve: As ſoon as they are become fluid, filtrate them through coarſe and ſpongy Paper, and then let the Liquor be preſerved for Uſe. When there is a call to uſe it, let a Bruſh or Feather be dipped into it, and afterwards rubbed over the Part, once or twice in a Day, as you ſhall ſee Occaſion: Or you may wet fine Linen Rags with this Liquor, and lay them upon the Part, not neglecting the Uſe of the emollient Cataplaſms at N°. VIII or IX. at the ſame time. This Method of Dreſſing ſhould be continued till the Parts ſhall ſuppurate or fall off in Cruſts or Scales. If this Application has ſo far anſwered your Intention, you may proceed to cleanſe the Wound with Digeſtives, and afterwards heal with a vulnerary Balſam, as we juſt now directed above at N°. XII. But if any Miſchief ſhould remain underneath after you have healed, you muſt again have Recourſe to corroſive Medicines, and, as to the reſt, proceed as we have directed above. The beſt Form of a corroſive Application that I have ſeen, is deſcribed by BELLOSTE, in his *Hoſpital Surgeon:* He is not ſhort in commending it himſelf; he ſays, when you are furniſhed with this, you may ſpare yourſelf the Trouble of ſearching for a better Remedy. The following is the Deſcription of it:

℞. *Spirit. Nitri vel Aquæ Fort. P.* ij. *Argenti Vivi P.* j. *m. f. lento calore Mercurii ſolutio.*

The mortified Part is to be wetted with this corroſive Liquor, which will occaſion a ſpeedy Separation of it from the ſound Parts. But I myſelf have ſeen, where the vitiated Parts were not ſeparated from the ſound by this Corroſive; and, what is worſe, even the ſound Parts were deſtroyed by the Application of it.

XIV. Several Phyſicians and Surgeons, particularly the famous [a] BOERHAAVE, adviſe cauteriſing or dividing with the Knife down to the Bottom where it is ſound, and this Method they prefer to all others. But as this Kind of Treatment carries great Cruelty with it, and cannot be performed without giving the Patient violent Pain, and is frequently attended with Danger, I cannot help preferring the Uſe of *Suppurants* or *Mild* Corroſives, as a gentler and ſafer Method of Cure: And indeed the Surgeons of the preſent Age, in general, are not ſo fond of calling for the actual Cautery as their Fathers were, eſpecially where they can find Remedies of equal Efficacy. Of the actual Cautery in this Caſe.

XV. Laſtly, when the *Sphacelus* is ſo deeply fixed in any Part of the upper or lower Extremity, that it has penetrated through the Muſcles, as far as to the Bone, and has reſiſted all the Force of Medicines, or the proper Time for applying them has been neglected; in this Caſe, for the Preſervation of Life in the Amputation when to be performed.

[a] BOERHAAVE's Aph. *De cognoſc. & curand. Morbis,* N°. 462.

Parts that remain untouched, the injured Part must be separated from the Body, with proper Instruments. We shall fully describe the Method of doing this in each particular Part of the Body, when we come to treat of *Chirurgical Operations*. In the mean time, I cannot give the Surgeon a more seasonable Piece of Advice than this: That whenever he thinks the Amputation of a Part necessary, he cannot more effectually consult his own Reputation and his Paitent's Safety, than by calling in a prudent *Physician* or two, that may confirm his Opinion of the Necessity of the Operation; and may give him their Assistance if any bad Accident should happen, such as Hæmorrhage, Faintings, Fever, and the like, which are very common Consequences of these great Operations. He should, above all Things, consider the Strength of the Patient; whether he is able to undergo the Operation. And where the *Sphacelus* arises from an internal Cause, and the best Remedies have proved ineffectual, the Amputation should not be hastily undertaken: For, in this Case, it is generally unsuccessful; as GARENGEOT and many others have testified. The Surgeon should also be very careful in keeping up the Strength of the Patient as much as possible, lest he should sink under the Discharge of Matter.

CHAP. XV.

Of BURNS *and* SCALDS.

A Burn, what.

I. I BELIEVE no one will be offended at our treating of *Burns* as a Species of Inflammation, since the Appearance, as well as Consequences, of both are exactly the same. Injuries that are received in any Part of the Body, either by Fire itself, or by the Instruments heated with Fire, we call a Burn or Scald. Therefore we do not reckon Fire alone as the Cause of Burns and Scalds, but any other Bodies whether solid and hot, as live Coals, Iron, or other Metal, red-hot or melted; Gunpowder, or boiling Liquors, as Water, Beer, Wine, Oil, *&c.* are all to be reckoned under this Head.

The Nature of a Burn or Scald.

II. When any thing of this Kind is applied to the Body, the Fibres and small Vessels of the Parts that are touched by it, will instantly corrugate and burst, whilst the Blood and other contained Fluids will be extravasated, stagnate, and corrupt. The Burns that we receive from solid Bodies are always attended with more grievous Consequences than those which are occasioned by boiling Liquors (which we call *Scalding*) therefore there are different Degrees of this Injury, as there are of Inflammation.

Four Degrees of Burns.

III. We may very fairly therefore divide Burns or Scalds into four Degrees. The *first*, and slightest, is that which occasions Heat, Pain, and a small Vesication on the injured Part, in a short Time. The *second* Degree is, when the Part is instantly affected with great Pain and Vesication. The *third* is, when the common Integuments, and subjacent Flesh are so burnt, that they form a Crust. The *fourth* and last is, where every thing is destroyed quite down to the Bone. The third Species is nearly allied to the Gangrene, and the fourth to a *Sphacelus*. This illustrates the near Relation between Burns and Inflammations.

Prognosis.

IV. By considering the Degree of the Burn, and the Use and Consequence of the Part burnt, you may prognosticate in what Manner the Injury will terminate. A Vesication raised in the Hand by the Fire, is less to be dreaded, than

than a ſlighter Burn upon the Eye; for that very tender and uſeful Part of the Body, can ſcarce receive any Injury by Fire, without endangering the Loſs of Sight. We ſhould alſo conſider the Extent of the Burn, what length of Time it has been upon the Part, before we can form a true Judgment of the Conſequences that will attend it: For the Danger will be greatly increaſed by the length of Time that the Part has been injured, and in Proportion to the Degree to which the Injury has ſpread itſelf. For where the whole Surface of the Body is burnt with Gunpowder, or ſcalded with any boiling Liquor, though the Injury conſidered in any particular Part, ſhall be looked upon as a very ſlight one, yet by being ſpread to ſo great an Extent, it is a Diſorder of the laſt Conſequence. In this Caſe, it is impoſſible for the Patient to lay down or change his Poſture without horrid Pain and Torture, which will prevent his Sleep, increaſe his Fever, and by Degrees bring on a *Sphacelus* and Death itſelf. And this is the Caſe more particularly in Infants, ſince they have leſs Strength and Patience than Adults, and want Reaſon to diſcover which would be the moſt convenient Situation for them. The Danger of the Burn will likewiſe be increaſed, in Proportion to the Depth to which it has penetrated. Burns of the Face are not only to be dreaded for the Deformity which they occaſion, but chiefly for the Inconveniences that they may produce by cauſing the Eyelids to grow together. Deep Burns of the Neck, if not timely remedied, occaſion a Wryneſs of that Part. You will eaſily be able to foretel what Danger or Inconvenience will ariſe from Burns of any other Part, if you diligently conſider what we have here ſaid, and are well ſkilled in the natural Uſe of the injured Parts.

V. As we obſerved above that Burns nearly reſembled inflammatory Diſorders in their Degrees, ſo do they in the Method of Cure. In the ſlighteſt or firſt Degree of a Burn, the Intenſion is to diſperſe it by the Remedies which we adviſed for a *Phlegmon*, (*Chap.* II. § IX.) Of theſe there are two Sorts, *Aſtringents* and *Emollients*. The beſt ſlight Aſtringent is, *Spiritus Vini* [a] *vel Vulgaris bonæ notæ, vel rectificatus, vel & camphoratus*. This may be applied to the Part with Linen Rags. With the ſame Intenſion alſo you may order *Acetum Lithargyriſatum, Muria Braſſicæ conditæ, vel & Oxycratum cum Sale decoctum calidumque:* Theſe may be applied in the ſame Manner with the foregoing, and ſhould be repeated as you ſhall ſee Occaſion. *Oleum Terebinthinæ* has very good Effects in this Caſe, if you apply it in Time, and repeat it frequently. The vulgar Method of applying the burnt Part to a Candle or the Fire, and keeping it in that Poſition as long as you can bear it, repeating this Proceſs till all Senſe of Heat and Pain is entirely removed, is frequently attempted with Succeſs, where the Injury is in one of the Fingers or on the Hand. For the ſtagnating Fluids are by the Force of the Fire driven back into their proper Channels, and by this Means the Veſication and other troubleſome Symptoms which uſually ſucceed, are happily prevented. From hence it appears, that the firſt Degree of Burns is eaſily remedied. Cure of the firſt Degree by diſperſing Remedies.

VI. There is another Method of Cure, which is equally efficacious with the former, though it is founded upon a contrary Intenſion. This is by *emollient Remedies*, which remove the Tenſion of the Fibres and Veſſels, and reſtore the By Emollients.

[a] This is highly and deſervedly recommended by the great SYDENHAM, in his *Practical Works*.

Blood to its natural Courſe, before any bad Symptoms come on. The injured Part may be fomented with Water, as hot as the Patient can bear it, till the Pain and Heat entirely diſappear. SYDENHAM highly recommends this Practice, and, in my Opinion, with great Juſtice. But this Fomentation will be improved if you boil ſome emollient Ingredients in the Water, as *Althæa*, *Malvæ*, *Verboſcum*, *Sem. Lini*, *Fœnum Græc. Mali Cydonii Semina*, or others of this Intention. But emollient Cataplaſms are of the higheſt Service in this Caſe, made of any of the abovementioned Ingredients for a Decoction, and frequently laid on upon the affected Part as warm as they can be endured. Emollient Oils alſo have their Uſe in forwarding this Intention, as *Oleum Lini*, *Amygdalarum dulcium*, *Olivarum*, *Liliorum alborum*, *Hyoſciani*, and the like. Theſe Oils are to be uſed either by dipping Rags into them, and applying them to the burnt Parts; or they may be laid on frequently with Feathers as faſt as they begin to dry away. We muſt not omit in this Place to mention a famous Liniment of MYNSICHTUS, which he calls his *Unguentum ad Ambuſtiones*. This is compoſed *ex Oleo Lini vel Olivarum cum Albumine Ovi mixto*, and applied as the Oils above. *Mali Cydonii Mucilago* is properly enough preſcribed in this Caſe. The Remedies which we have here recommended never give effectual Relief, unleſs frequently repeated. Therefore when the Face is burnt, they ſhould be ſpread upon a Linen Maſk, which you muſt keep continually moiſt by freſh Applications of the Remedy. (See *Plate* XXXVII.) Where the Neck is burnt, to prevent it from contracting you muſt have Recourſe to a particular Kind of Bandage, which you will find deſcribed below, when I come to treat of Bandages.

Cure of the ſecond Degree.

VII. When the Burn is of the ſecond Degree, which I have deſcribed above, attended with Veſication or Puſtules, I would by no means adviſe opening the Veſications or ſcarifying the lacerated *Cutis*, becauſe this Practice brings on very ſharp Pains. You will always find it more adviſeable to apply one of the Remedies preſcribed above; the neareſt at hand, ſuppoſe warm Water, burnt Wine, or Spirits of Wine; and renew the Application of it frequently. By this Means you will find the Heat and Pain quickly go off, and the Cuticle will ſeparate from the *Cutis*, without leaving any Deformity. But if, notwithſtanding the repeated Applications of theſe Remedies, ſome Pain ſhall ſtill remain, dreſs the Part with Emollients. The moſt eligible of theſe are *Oleum Lini*, *Unguentum ad Ambuſtionem* MYNSICHTI, *vel Nutritum*, *de Lithargyrio*, *vel Diapompholygos*: Theſe ſhould be either rubbed into the Part frequently, or ſpread upon a Linen Rag and applied to it. After the Heat and Pain are removed by theſe Applications, lay on the *Empl. ad Ambuſta*, *vel de Minio*, which will keep the Skin ſmooth, and forward the Renovation of the Cuticle. If the Injury is very conſiderable as to its Extent, and great Part of the Body is ſcalded or burnt, it will be neceſſary to open a Vein and bleed plentifully, even *ad animi deliquium*, and afterwards you ſhould preſcribe a briſk Purge, of the ſame Kind which we directed for Contuſion. (*Book* I. *Chap.* XV. § XIII.) This Method may poſſibly prevent ill Conſequences which uſually attend Burns of large Extent, ſuch as foul Ulcers, large Cicatrixes, and Gangrene itſelf. The ſame external Dreſſings are to be applied in this Caſe which we adviſed above. When *Infants* are the Subjects of this Diſorder, their tender Age prevents us from Bleeding plentifully: Therefore the Revulſion muſt be made by repeated Purging. That ſtrict Regularity in Diet which we enjoined above in treating of

Wounds,

Wounds and Inflammations, is never more requiſite to be obſerved than in this Caſe: All Intemperance is of the laſt Conſequence, as it increaſes the Fever and Pain. According to the Opinion of the famous DIGBY, nothing takes off the Heat ſooner than *Spiritus Salis* given from *Guttæ* x to xv. in any Liquor, and repeated at Diſcretion. Theſe Methods being timely and diligently proſecuted, heal and reſtore the burnt Parts of the Body in a moſt wonderful Manner.

Cure of the third Degree.

VIII. In the third Degree of Burns, where the injured Part is covered with a Cruſt or Eſchar, the Cure cannot be performed without Suppuration. When this happens in the Face, we ſhould uſe all our Attention to prevent Deformity, which may be occaſioned by a large Cicatrix. Therefore in this Caſe, the Uſe of all Plaſters and Ointments whatſoever is to be avoided, even though they ſhould be eſteemed as valuable Secrets, and highly commended for their Virtue in curing Burns and Scalds. For the Miſchief of theſe Kinds of Remedies is, that they dry up the Wound too faſt, and at the ſame time contract the Fibres and the Skin, and by that Means leave a very unequal Cicatrix. For the ſame Reaſon you cannot be too ſollicitous in forwarding the caſting off of the Eſchar, and the Evacuation of the Matter that is concealed under. But to diſcover the happieſt Means of performing theſe Intenſions, *hoc opus, hic labor eſt.* They who attempt this by tearing away the Eſchar with their Hands, or endeavour to ſeparate it with the Knife, by no means conſult the good of their Patients. The eaſieſt and moſt ſucceſsful Method, in my Opinion, is, by the Uſe of Emollients. Any of the Emollients we mentioned above may be applied warm, and repeated till the hard Cruſt ſeparates from the live Fleſh. The Part ſhould be dreſſed two or three Times in a Day, and at each Dreſſing, if you ſhould obſerve any Portion of the Cruſt tending to a Separation from the reſt, you ſhould remove it with your *Forceps*, and anoint the remaining Cruſt with Butter, at the ſame time being never neglectful of the Uſe of Fomentations. This Method ſometimes takes up two, ſometimes three, ſometimes four Days before it performs its Office. The Cruſt being now entirely caſt off, our next Intenſion is, to cleanſe and heal the Wound. The firſt of theſe Offices may be very well executed by any mild digeſtive Ointment, mixed up with *Mel Roſarum:* The Medicines uſed for healing the Wound, are principally *Unguentum Diapompholygos, vel de Lithargyrio, necnon Emplaſtrum ad Ambuſta.* But if any Portion of the Eſchar is left under theſe Ointments and Plaſters, Experience ſufficiently teſtifies the Danger that will follow, of making a deformed Cicatrix, from the Conſtruction of the neighbouring Parts, and from the Acrimony of the confined *Sanies.* Whoever proſecutes this Method of Cure, ſhould always obſerve, that if the Eſchar does not ſeparate in two or three Days, it will be neceſſary for him to make a deep Inciſion into it, that the *Sanies* may have room to diſcharge itſelf, (as we adviſe in the Caſe of Gangrenes, *Chap.* XIV. § VII.) And then the Fomentations above mentioned are to be diligently applied, the Evacuations by Bleeding and Purging being always premiſed. Proper Regulations with regard to Diet are never more neceſſary to be complied with, than in this Caſe. The beſt Method of encouraging the Renovation of the Skin, is, by frequently holden the burnt Part over the Steam that ariſes from boiling Water. Where the Part ſkins over very ſlowly, it may be proper to dreſs the Part with a Cerate made *ex Cerâ & Ovorum Oleo.*

Cure of the fourth Degree.

IX. But what is to be done in the fourth Degree, which we have deſcribed, which is always attended with extreme Danger? For when the Burn has penetrated ſo deep as to deſtroy all the Parts, quite down to the Bone, Medicine can take no Place. Therefore there remains but one Remedy, and that a dreadful one, to wit, to amputate the injured Limb, that the ſound Parts may be ſaved, as we adviſed above in treating of a *Sphacelus* (*Chap.* XIV. § XIV.)

CHAP. XVI.

Of a SCHIRRUS.

A *Schirrhus* what.

I. WE have already taught, that the fourth Manner in which an Inflammation terminates is a *Schirrhus*. We uſually call a hard Tumor of any Part of the Body, that is void of Pain, a *Schirrus:* This almoſt always ariſes from the Inſpiſſation and Induration of the Fluids contained in a Gland; though it may appear in other Parts, particularly in the Fat[a].

Seat of a *Schirrhus.*

II. The Seat of a *Schirrhus* is very various: For this Diſorder is not confined to the internal Parts alone, to wit, to the Liver, Spleen, Lungs, Meſentery, Pancreas, and in Females to the *Uterus:* But it frequently happens alſo to the external Parts, as to the Lips, Tongue, Tonſils, *Fauces*, Palate, Gums, Neck, *Mammæ*, *Axillæ*, *Inguina*, *Penis*, and Teſticles; and that generally after a previous Inflammation of any of thoſe Parts. A *Schirrhus* ſometimes appears without any previous Inflammation; eſpecially in Subjects of a heavy, phlegmatic, melancholic Habit of Body. Sometimes it is occaſioned by an external Injury, as by a Fall or Blow, *&c.* It is no difficult Matter to determine the principal Cauſe of the Diſorder.

Effects of a *Schirrhus.*

III. As ſoon as a *Schirrhus* is formed, it is an immediate Conſequence that not only the indurated Part becomes unfit to perform the Function allotted it by Nature, but the neighbouring Parts alſo will ſuffer Preſſure, and be impeded in the Performance of their Offices. Therefore it ought to appear no Wonder that the neighbouring Parts ſhould be ſubject to Inflammations, Exulcerations, Cancer, Gangrene, *Tabes*, Stiffneſs, Immobility, or the like, according to the Nature of the injured Part.

Signs.

IV. You will be at no great Difficulty in determining the Caſe to be a *Schirrhus*, when you diſcover a hard Tumor, on the external Parts (more particularly in thoſe Parts where the Glands are moſt frequent) and the Tumor is entirely free from Heat, Redneſs, and Pain. As I am ſpeaking to *Surgeons*, I only treat of external *Schirrhi:* For thoſe which are ſituated in the internal Parts, fall very juſtly under the Province of the *Phyſician.*

Prognoſtic.

V. In order to form a proper Prognoſtic of this Diſorder, ſeveral Things are to be obſerved. (1.) The more inveterate the *Schirrhus* is, ſo much the more dangerous will it be, and more difficult of Cure. (2.) A *Schirrhus* happening to young Perſons, and to thoſe of a firm Habit of Body, is much more ſafe and tractable, than when it falls upon Perſons advanced in Years: Particularly

[a] See a learned Diſſert. of GRASHUSIUS, an eminent Phyſician at *Amſterdam*, on the *Schirrhus* and *Cancer*.—*Amſt.* 1741.

where

where Children have indurated Glands in the Neck, but are in all other Reſpects in perfect Health, they are ſeldom attended with any Miſchief; and you uſually find they outgrow it: But in Valetudinarians, or where you have Reaſon to ſuſpect the Pox to be at the Bottom, the Caſe is far otherwiſe. (3.) A *Schirrhus* is of more or leſs Conſequence in Proportion to the Conſequence of the Part it falls upon, in Performing the neceſſary or noble Offices of Life. For this Reaſon, internal *Schirrhi* are always more dangerous than thoſe which happen upon the external Parts [a]. Laſtly, (4.) The greater Miſchiefs the *Schirrhus* brings on, by ſo much the more grievous will it be. For as long as it lays quiet, and produces no Pain, ſo long will it remain without Danger: But as ſoon as it becomes painful, or is ulcerated, it generally threatens an approaching *Cancer*. It may be proper to inform you in general, that the Cure of *Schirrhi* by Medicine, is uſually attended with the greateſt Difficulty: Therefore you ſhould never flatter your Patients with the Promiſe of certain Relief. But ſometimes they do admit of a Cure with the Knife or with Corroſives, eſpecially in younger Subjects that are otherwiſe of a good Habit of Body.

VI. When the *Schirrhus* is of long ſtanding, and the Patient infirm, it is far better to abſtain entirely from any Attempt to cure it, than to pretend to bring it to Digeſtion. For in this Caſe, it is much to be feared, eſpecially in the Breaſts of Women, that whilſt you are proſecuting your Intention, the diſeaſed Part may ſhew its bad Diſpoſition, and become apparently cancerous. On the other hand, where the *Schirrhus* is but newly formed, and you have no Signs of vehement Pain or Hardneſs, where your Patient is otherwiſe of a ſound Habit of Body, I ſee no Reaſon why you ſhould not uſe both external and internal Remedies, to ſet the confined Fluids at Liberty. The internal Remedies, which are found principally ſerviceable in anſwering this Intention, are the Decoctions of the Woods, digeſtive Tinctures or Eſſences, and mild Mercurials, giving between whiles relaxing Medicines, to reſolve the thick inſpiſſated Humours [b]. It is very dangerous to truſt to the Uſe of external Remedies alone: Therefore a prudent Phyſician ſhould always be conſulted in this Caſe, who may not only preſcribe proper internal Remedies, but direct the Patient alſo what Sort of Regimen will be moſt uſeful for him to obſerve, with regard to his Diet. Method of Cure.

VII. With regard to external Reſolvents, *Plaſters* claim the firſt Place: Such I mean as are made of the warm Gums, as *Gum. Ammoniac. Galban. Opopon. Sagapen. Bdell. &c.* which may be applied alone or mixed together; ſometimes with the Addition of *Radix Bryoniæ atque Ariſtolochiæ rotundæ* finely powdered. Of the ſame Intention are *Empl. de Galbano, de Gum. Ammoniaco, de Cicutâ, de Ranis* VIGONII, *vel Diachylon cum Mercurio*; or the following: Diſperſing by (1.) Plaſters.

℞. *Gumm. Galban. Opoponac. ana* ℥j. *Ammoniac. Bdell. ana* ℥ij. *Ol. Olivar.* ℔ij. *Ceræ Citrin.* ℔ *ſs. Pulv. Ariſtoloch. long. ver. & rotund. ver. Lapid. Calaminar. Myrrh. Thur. ana* ℥j. *Terebinthin. Venet.* ℥iv. *m. f. ſ. a. Emplaſtrum.*

[a] Where a *Schirrus* falls on the internal Parts, particularly the Meſentery or the Lungs, it is generally attended with ſuch Tumors, as deſtroy the Patient.

[b] For the internal Method of Cure, ſee my *practical Compendium*, Cap. xii. Sect. 29 & 30.

VIII. The

(2.) By Cataplasms.

VIII. The next Place to Plasters is held by *Cataplasms*. Amongst the principal of which may be reckoned the following:

℞. *Rad. Bryon. alb.* ℥iv. *Aristoloch, rotund. Angelic. ana* ℥j. *Herb. Sabin. Rut. Scord. Absinth. Flor. Chamæmel. ana M.* j. *Melilot. Sambuc. Althææ, Centaur. minor ana M. fs. coq. cum q. s. Aquæ simplic. ad consistentiam Cataplasmat. vase clauso, sub finem addendo Galban. (Vitell. Ov. q. s. solut.)* ℥iij. *Farin. Lini* ℥ij. *Ol. Lini q. s. f. Cataplasma.*

This Cataplasm, or, if you rather choose it, a Fomentation made of the same Herbs boiled in Vinegar, is to be applied warm, and repeated as you shall see Occasion, not neglecting at the same time the Use of internal Remedies.

(3.) By acid Vapours.

IX. Some highly recommend acid Vapours in this Case. Sometimes it has been found serviceable to receive the Steam of boiling Vinegar upon the diseased Part, either of common Vinegar, or of that made with Lavender, Alder, Rue, or *Theriaca*. Some sprinkle the Vinegar upon a hot Stone, and receive the Steam through a Funnel. Others set *Sulphur* on Fire, and hold the Part over the Fume. Others again are fond of Fumigations of *Cinnabar*. Great Care must be taken in this Case not to raise too large a Fume, nor to repeat it too frequently, and the Patient must be cautioned not to admit it at the Nose or Mouth. For it can scarce be said how injurious these Steams are to the Lungs, and the Quantity of Mercury contained in Cinnabar, makes it very apt to raise a Salivation.

(4.) By Mercurials.

X. Mercurial Medicines perform Wonders in this Case, either administered in the Beginning, or after other Remedies have failed. Besides giving Mercurials internally, you may make an excellent Ointment, *ex Hydrargyro cum Adipe Suillâ, necnon modico Terebinthinæ, quantum ad eum subigendum sufficit, admixtis in Mortario vitreo vel lapideo.* The *Schirrhus* should be anointed twice or thrice a Day with this, covering it with the *Emplastrum Vigonis cum Mercurio.* But to prevent this Method from raising a Salivation, it will be necessary to prescribe an opening Medicine every fourth or fifth Day, such as *Rad. Jalap. præp.* or *Extract. Rud.* in small Doses. Whilst the Patient is in this Course, his Jaws should be very diligently inspected, and if you find the Glands enlarge and grow painful, you must entirely omit the Use of Mercurials, and repeat your purging Medicines, till all these Symptoms of an approaching Ptyalism entirely disappear. By observing these Cautions, you may have very good Reason to promise yourself Success, where you are called in Time, before the Case is become desperate.

(1.) By the Knife.

XI. If all the abovementioned Remedies prove unsuccessful; if the *Schirrus* is free and moveable, and its Situation threatens no great Danger from the Neighbourhood of considerable Vessels; if you shall judge the Strength of the Patient to be sufficient to undergo the Operation, you may very fairly call the Knife in Aid, to prevent the Case becoming cancerous (which too often happens.) When you have taken out the *Schirrus*, dress the Wound with a digestive Ointment, and afterwards with the *Linimentum Arcæi*, or any other vulnerary Medicine, and heal as we have directected in other Wounds. This Method DEIDIER particularly recommends, *Lib. de Tumor.* p. 129.

When the Case is entirely to be let alone.

XII. Where the *Schirrus* is fixed, knotty, uneven, and deeply rooted; where the Patient is of a bad Habit of Body, is subject to form *Schirrhi* from some hereditary

hereditary Taint, or perhaps has formed ſeveral already; or laſtly, where the Situation of the Diſorder is ſuch, that, from the Vicinity of conſiderable Veins and Arteries, you are in apparent Danger of bringing on an Hæmorrhage which may prove fatal: Then all Attempts to cure, whether by the Knife, or by digeſtive or corroſive Applications, are to be neglected [a]. For this Kind of *Schirrhus* is almoſt conſtantly attended with very ſharp Pains, and often degenerates into a *Cancer*. In this Caſe therefore the Pains are to be aſſuaged, if poſſible, and the Cancer to be prevented.

XIII. When you are under Apprehenſions of an approaching Cancer, your Buſineſs is not only to attempt to correct the Acrimony of the Blood, by the Uſe of both internal, as well as external Remedies, but a ſtrict Regimen with regard to Diet, muſt alſo be moſt religiouſly enjoined. Conſtitutions of this Sort are much mended by the Uſe of Broths and Soops of various Kinds, made from the Fleſh of younger Animals, with the Addition ſometimes of a few Pot-herbs, *ſc. Hordeum, Avena, Oryza, Milium, Spinachia, Aſparagus, Scorzonera*, &c. The moſt wholſom common Drink in this Caſe, is either fair Water, or a Ptiſan made *ex Decocto Radicis Chinæ, Sarſaparill. Gramin. Polypod. Veronicæ, Linguæ Cervinæ, Agrimon. Solidagine Saraſenica, Herb. Parietar. Capillor. Veneris*, and others of this Kind. When the *Schirrhus* is attended with violent Pains, you may add to the Materials of your Decoction, *Sem. Papaver. albi*, and if the Patient has no Objection to it, you may ſweeten it *cum Sirupo Papaver. albi*. It will be very proper alſo at this Time to correct the Acrimony of the Blood by giving two or three Times every Day, a Doſe, *e Pulv. Lap. Cancr. Sale Abſinthii, Cinnabari Nativâ, Antimonio Crudo, Antimonio Diaphoretico*, adding to each Doſe, as you ſhall ſee Occaſion, *Laudani Opiati gr.* ſs. to aſſuage the Vehemence of the Pain. Wonders are alſo effected in this Caſe by the *Pulvis Succuſve recens ex Millepedibus*, with *Sperma Ceti ad* ʒj. to be given with any of the foregoing Powders; by Purges even of the Mercurial Kind, and by bleeding and cupping frequently in Spring and Autumn. Internal Medicines to prevent a *Cancer*.

XIV. A thin Plate of Lead, well impregnated with Quickſilver, may very conveniently be faſtened on the Part, and worn there conſtantly with ſome Benefit. For this Method frequently leſſens the Senſe of Heat and Pain, not to ſay that it frequently prevents the Cancer. But if the Application of a Plate of Lead ſhall ſeem to be unequal to the Intention for which it was deſigned, then you may apply Plaſters and Ointments compoſed of ſuch Ingredients as are moſt likely to aſſuage the Pains. Of this Kind are the following: External Applications.

℞. *Unguenti Diapompholygos* ℥ij. *Opii puri* ℈ſs. *m. f. Ung. quocum pars affecta ſæpius inungatur. Vel,*

℞. *Amalgam. Mercur. & Plumbi* ℥j. *Unguenti Roſati q. ſ. m. f. Unguentum cum Linteo inſtar Emplaſtri applicandum. Vel,*

℞. *Aceti Lithargyriſat.* ℥j. *Olei expreſſ. Sem. Hyoſcyam. Papav. alb. Olei infuſ. Roſar. ana* ʒij. *m. f. ſ. a. Nutritum, cui ſub finem add. Opii puri gr.* vj. *ad* x. *quod linteolis illitum aliquoties quotidie ſuper Schirrhum applicetur.*

[a] But if the Surgeon is expeditious in ſtopping the Blood and dreſſing the Wound, he may ſometimes attempt the Cure of the moſt inveterate Schirrhi, and not without Succeſs. I have myſelf often undertaken very extraordinary Schirrhi in the parotid and ſubmaxillary Glands, where I was obliged to cut the large Ramifications of the external Carotid Artery: Nor did any one of thoſe Patients miſcarry.

If your Patient diſlikes the Application of theſe Ointments, and prefers a neater Application, you may ſubſtitute refrigerant Plaſters in their room: Such as *Emplaſtrum Saturninum* MYNSICTH. *de Minio*, *Diapompholygos*; or laſtly, that excellent Plaſter for alleviating Pain, which is preſcribed in the following Manner:

℞. *Succ. recent. expreſſ. & purificat. Fol. Hyoſcyam. Papav. Hortenſ. Phellandi ana* ℥iv. *coquendo leni igne inſpiſſa; ſub finem add. Ceræ alb.* ℥viij. *Ol. infuſ. Roſar.* ℥j. *m. f. Emplaſtrum. Vel,*

℞. *Sacch. Saturn. Ceruſſ. præparat. Amalgam Mercurii & Saturni, Ol. expreſſ. Hyoſciam. infuſ. Roſar. ana* ℥ij. *m. f. Emplaſtrum.*

If the Pains are very violent, you may add a diſcretional Quantity of *Opium* to either of theſe Plaſters, and apply it to the Part.

What is to be concluded concerning Suppurants, Corroſives, and the actual Cautery.

XV. Notwithſtanding many Phyſicians and Surgeons of Eminence at this Time recommend the Uſe of *Suppurants*, *Corroſives*, and even the *actual Cautery* for the Cure of ſchirrhous Tumors, yet I cannot help being of Opinion, that the Danger of a Cancer enſuing from the Uſe of Suppurants or Corroſives [a], and the natural Dread that moſt People are ſtruck with at the Sight of a red hot Iron, beſides innumerable other Inconveniencies, ought to diſſuade us from attempting ſuch ſlow, hazardous, and cruel Methods of Cure. For this Reaſon it will appear, that the ſafeſt and readieſt Method of deſtroying a large or painful *Schirrhus*, is, to cut the indurated Part entirely out, whether it be ſituated on the Lips, Salivary Glands, *Mammæ*, or Teſticles, provided you run no Riſque of a mortal Hæmorrhage, (§ XI, XII.) If you leave any Part of it behind, there is great Danger that it may lay a Foundation for a Cancer: Nay, what is hardeſt of all, though the *Schirrhus* be entirely rooted out, it frequently happens that another ſprings up without any Fault to be laid to the Surgeon. I can by no means approve of the Practice of ſome Phyſicians, who order the Bottom of the Wound to be cauterized, to prevent any Return of the *Schirrhus*, and to take off the Hæmorrhage. In this they are doing nothing [b], ſince it is of very little Conſequence in preventing the Return of the Diſorder, and there are many milder and ſafer Remedies at hand to ſtop the Hæmorrhage. Therefore when you have finiſhed your Operation, dreſs as in other Wounds.

CHAP. XVII.

Of a CANCER.

A Cancer, what.

I. WHEN a *Schirrhus* can neither be diſperſed, ſoftened, (See *Chap.* XVI. *N.* XII and XIV.) or taken out with the Knife, whether it be occaſioned by the Vehemence of the Diſeaſe, or the Ignorance and Maltreatment of the Surgeon, the Patient will complain of pricking Pains in the Part, and the Tumor will ſpread itſelf unequally. This malignant and worſt State of a *Schirrus*

[a] There are ſome Inſtances, where Schirrhi and Cancers have been cured by Cauſtics; but in general they are unſucceſsful.

[b] This was obſerved in the moſt antient Times. See CELSUS *Book* V. *Chap.* XXVII. § 2.

was

was called formerly *Carcinoma*, by us a *Cancer*. For the Veins about the Part are diſtended, and form Incurvations, which ſome imagine bear a Reſemblance to a Crab's Claws. As long as the Tumor is entirely covered with Skin, it is called an *occult Cancer:* But when the Skin breaks and is ulcerated, it is termed by the Phyſicians an *ulcerated Cancer*.

II. The Beginning and Increaſe of the Diſeaſe afford pretty near the following Appearances. At firſt there appears a very ſmall Tumor, which ſometimes maintains the ſame Size for a conſiderable Time, without any apparent Increaſe: On a ſudden it enlarges beyond all Conception. At firſt it is attended with little or no Pain, and that only by Intervals: Upon the Increaſe of the Tumor the Pain becomes intolerable, ſometimes ſo violent as not to be borne without Fainting. If you apply repelling or aſtringent Remedies to the Part, the Diſorder increaſes wonderfully: Inſomuch, that one Month will produce more Increaſe of Pain and Tumor, than a Year without any medicinal Applications. The Uſe of Medicine will ſo far irritate this Diſorder, that the Skin will preſently break, and form a foul ſtinking Ulcer. Beginning and Increaſe of the Diſeaſe.

III. A Cancer, as well as a *Schirrus*, will ariſe in almoſt any Part of the Body; but moſt frequently in the upper Parts; as the Noſe, Ears, Lips, and the Breaſts of Women, nay ſometimes of Men: A very memorable Inſtance of which you will find recorded by BIDLO. *(Excercit. Anat. Chirurg.)* But beſides theſe Parts, the Gums, *Fauces*, and Tongue, and even the Parts of Generation are ſometimes the Seat of a Cancer. Seat of a Cancer.

IV. The Cauſes of a *Schirrhus* and *Cancer* are common to both: Only theſe ſeem to have acquired ſome additional Acrimony. The maglignant *Stimuli* of a Cancer are not only produced by the Application of digeſtive, acrimonious, or cauſtic Medicines, but they are alſo occaſioned by ſundry other Cauſes. That Sort of Diet is moſt miſchievous which is moſt apt to produce Acrimony in the Blood. Therefore all Perſons that are by Habit of Body obnoxious to Diſorders of this Kind, ſhould religiouſly abſtain from Lard and Pork Meats. Grief and Trouble of Mind are very apt to create a cancerous Diſpoſition of Body. It is obſervable, that old Maids and even married Women that do not breed, are very ſubject to Cancers in the Breaſt. This generally happens to them when they are turned of Forty Years of Age, at the Time when the menſtrual or hæmorrhoidal Diſcharge begins to decreaſe or diſappear: Though I have frequently known this Caſe happen to Perſons not ſo far advanced in Years, even between Twenty and Thirty. Cauſes.

V. The Signs of an *occult Cancer* are as follow. The Patient perceives an Itching, Heat, or pricking Pain, in or about the *Schirrhus*. The neighbouring Parts grow livid: The Tumor has an unequal Surface, increaſes in Size, and grows conſiderably harder than before: The Veins enlarge and become livid, though this Circumſtance does not always happen. If the Caſe is an *ulcerated Cancer*, you will diſcover it not only by the Ulceration of the Part, by an occult Cancer having preceded it, but the following Symptoms will make it evident to Demonſtration. *Diagnoſis.*

VI. A thin *Sanies* flows from the Ulcer in great Quantities: Sometimes ſo corroſive and acrimonious, that the Dreſſings ſeem as rotten as if they had been eaten by *Aqua Fortis*. The Stench is intolerable, eſpecially to thoſe who are not accuſtomed to it, and fills the whole Chamber. The Diſorder continues to Symptoms.

ſpread itſelf wider, the Lips of the Ulcer enlarge, are wonderfully diſtorted and turned in; are ſometimes pale, ſometimes red, purple, green, livid, black, or variegated. Pains attended with a Senſation of burning, pricking, gnawing, come on at Times with ſuch Vehemence, that through Anguiſh and want of Sleep, the Patients are driven to almoſt Diſtraction and Deſpair, which greatly waſtes their Strength: Their Appetite and Senſe of Smelling entirely fail them, till at laſt Death delivers them from a miſerable ſtinking Carcaſe. The Urgency of the Symptoms which we have recounted, depends upon the Patient's Habit of Body, and upon the Situation of the Part affected.

Prognoſis. VII. An occult Cancer, which is not attended with any conſiderable Degree of Pain, may be endured for a conſiderable Length of Time, without any great Inconvenience, by a Perſon endued with Strength and Temperance. But theſe very ſame Perſons, by an Irregularity in Diet, or medical Application, will be ſubject to the ſame grievous Symptoms which we have juſt enumerated. Notwithſtanding what has been ſaid, many have imprudently boaſted that they have been poſſeſſed of infallible Secrets for the Cure of Cancers: Though at the ſame time it muſt be confeſſed with [a] HILDANUS, and other capital Phyſicians, who confirm the Opinion of [b] HIPPOCRATES, and [c] CELSUS, that no Phyſician has yet been happy enough to diſcover a Medicine from which he could promiſe any Certainty of Cure in this Caſe. We have a very memorable [d] Example of this in ANNE of *Auſtria*, Mother to LOUIS XIV, late King of *France*, who laboured under a cancerous Breaſt, and was not only attended by the Court Phyſicians, but by almoſt every one in that Kingdom who had any Pretenſions to the Practice either of Phyſic or Surgery; particularly by thoſe that boaſted of their ſecret Art in curing Cancers. But notwithſtanding all the Attempts of Art, which the Deſire of gaining a Royal Reward could excite, no Help could be obtained for her: From which we may very fairly conclude, that there is no Help to be expected from any thing but the Knife. The Hopes we may entertain from Extirpation, depend upon the Degree of the Diſorder, the Urgency of the Symptoms, and the Strength and Habit of the Patient. When you ſhall be of Opinion that the Cancer is ſo deeply rooted, that it will be impoſſible to extirpate it entirely, it is far better to lay aſide the Operation, than to torment miſerable Patients without any Hopes of relieving them. For Inſtance, when this Caſe falls upon the *Uterus*, *Fauces*, *Uvula*, *Tonſils*, *Axillæ*, and *Inguina*, it is ſcarcely ever curable. But Cancers of the Lips, *Palpebræ*, and *Mammæ*, are extirpated with Safety, and ſometimes admit of Cure: But there is great Danger of their returning. Some believe a Cancer to be contagious, though I could never obſerve any Foundation for this Opinion, though I have been pretty converſant in theſe Caſes.

KORTHOLTUS's Remedy for a Cancer. VIII. In *Ephemerid. Breſlavienſ. Phyſico-Medicis*, which were ſometime ſince publiſhed in *High Dutch*, in ſeveral Volumes, and alſo *in Praxi Medicâ* NENTERI, you will find great Recommendations of a *Noſtrum* of KORTHOLTUS's, which is corroſive and emetic. But I muſt tell you at the ſame time, that I

[a] *In Lib. de Gangræna, cap.* VII. [b] *Aphoriſm.* XXXVIII. § 6. *quibus occulti Cancri fiunt, eos non curare (ſive attingere) melius eſt. Curati enim cito pereunt, non curati vero longius tempus perdurant.* [c] *Lib.* V. *Cap.* XXVII. § 2. [d] See *Memoires de Madame* DE MOTEVILLE, *Tom.* V.

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am informed by Men of the greateſt Credit, that it is of no Efficacy in the true Cancer.

IX. When a Cancer yields to no Medicine; when it happens in old Age, or to a bad Habit of Body; when it is ſituated under the *Axillæ*, or near large Blood-veſſels, or has ſpread itſelf to a great Extent, and is of long ſtanding; or where the Patient is afflicted with a Cancer in more Parts than one; in either of theſe Caſes the Knife is foreign to our Purpoſe. For as the vitiated Parts can never be entirely extirpated, the Surgeon, by attempting the Operation, will only make Matters deſperate, and haſten the Death of his Patient. Therefore the beſt Method of treating an incurable Cancer, which is not yet broke or ulcerated, is, (1.) To endeavour, without uſing any violent Means, to prevent it from degenerating into an Ulcer: (2.) To relieve and aſſuage the moſt threatening Symptoms. In this Manner we may prolong the Proſpect of Death, and many other Miſchiefs, by a palliative Method. When a Cancer is incurable.

X. If any one is deſirous of palliating this dreadful Caſe, he muſt look for Aſſiſtance, not from Medicine alone, but principally from a diligent Obſervation of Rules with regard to Diet: Which we have already explained at large in diſcourſing of a *Schirrus*. (*Chap.* XVI. § VI, &c.) The Patient ſhould loſe Blood in Spring and Autumn, but if of a plethoric Habit, oftener; and the Bowels ſhould be conſtantly kept open. It would not be amiſs alſo to adviſe the Uſe of *Goats Milk*, unleſs the Patient has a particular Averſion to it: You may give it either alone or boiled with vulnerary Herbs or Crayfiſh. By this Method you may very ſucceſsfully prevent very dangerous Symptoms. But if notwithſtanding this, violent Pains ſucceed, it will be proper to give him a Doſe of *Opium* now and then, or to boil *Sem. Papav.* in his Drink: Or you may make an Emulſion of them. Theſe Medicines, by giving Sleep, are excellent Remedies againſt Pain and Weakneſs. The ſame Method is to be obſerved with regard to external Treatment, which we preſcribed in the above cited Place. Palliative Method.

XI. Almoſt the ſame Method is to be obſerved in treating a Cancer that is broke or ulcerated: Only in this Caſe the Part is to be kept clean, the *Saniès* frequently wiped off, and the Ulcer to be filled with ſoft dry Lint; or, in order to leſſen the Pain, the Part may be anointed before it is dreſſed, with ſuch Medicines as obtain moſt Credit for anſwering this Intention. The principal of theſe are, *Ol. Myrrhæ per deliquium, vel ejus Eſſentia cum Eſſentia Succini, vel Aqua Calcis ſola, aut pauxillo Sacchari Saturni admixto. Vel,* How an ulcerated Cancer is to be treated.

℞. *Aceti Lithargyriſati* ℥ j ß. *Olei Roſacei aut Solani* ℥j. *m. f. in mortario plumbeo aut vitreo Unguentum, quod Nutritum appellatur, Vel,*

℞. *Aq. Roſar. Flor. Sambuc. Papav. erratic. ana* ℥ij. *Sacch. Saturni, Eſſent. Opii ana* ℥j. *Spirit. Vini Theriacal.* ℥ij. *M. Vel,*

℞. *Aqua Sperm. Ranar. Solan. ana* ℥iij. *Plumb. uſt.* ℥j. *Sacchari Saturni* ℥ß. *M.*

In the Place of theſe you may ſubſtitute a vulnerary Decoction *ex Herb. Marrab. Agrimoniæ, Veronicæ*, &c. or *Succ. Solan. & Plantagin.* The Ulcer may be very eaſily waſhed with any of theſe at every Dreſſing, and the Lint may be wetted with them. But if the Pain ſhould be very violent, you may then in-

creaſe your Doſe of *Opium* or Eſſence of *Opium*, or you may moiſten the Pledgits with Eſſence of *Opium* at every Dreſſing: Since it will be impoſſible to aſſuage the Pains with a leſs powerful Medicine. The Eſſence of *Opium* to be uſed in this Caſe, is not to be prepared *cum Spiritu Vini*, but rather *ex Aquis deſtillatis, ex Solano, Floribus Papav. Erratic.* DIONYSIUS adviſes a raw Piece of Veal to be laid on the Part. Dry Powder ſhould never be ſprinkled upon a Cancer, as it is cuſtomary on other Ulcers. The Dreſſing with *Plumbum uſtum cum Sem. Lini aut Pſyllii Mucilagini miſt.* mitigates the Pain in a ſurprizing Manner. Varying the Application in this Caſe is very uſeful, but we ſhould ſtick moſt to thoſe Remedies which ſeem to agree beſt with the Patient. Laſtly, the *Aqua Vulneraria ſive Sclopetaria*, commonly known by the Names of *l'Eau d'Arquebuſade* prepared with *Aqua Solani*, rather than with Wine or Spirits, being laid on warm and frequently repeated, is of eminent Service.

How a Cancer is to be extirpated.

XII. When the Cancer is ſo circumſtanced that you may venture upon Extirpation, without Danger of any conſiderable Miſchief; you are firſt to adminiſter mild cathartic Medicines to cool and correct the Acrimony of the Blood: (§ XI.) But more particularly to prepare the Patient by an exact Regimen with regard to Diet, before you attempt the Operation. The Inſtruments which are uſed in taking off Cancers of the Lips, Eyes, *Mammæ*, and Parts of Generation in the Male, you will find deſcribed below in their proper Place, when I come to treat profeſſedly of Chirurgical Operations. The Wound is to be dreſſed in the ſame Manner which we have directed for treating other Wounds; with a digeſtive Ointment, and vulnerary Balſam. The Dreſſings ſhould be laid on lightly, and but ſeldom repeated, which will greatly conduce to the Cure. When the Wound is healed, the Patient ſhould obſerve a very ſtrict Regimen with regard to Diet through the remaining Part of his Life. He ſhould entirely abſtain from all acrimonious, ſalt, acid, or ſpiced Meats: He ſhould frequently take gentle cooling Purges, the beſt of which are the Purging medicated Waters; not omitting to loſe Blood by Cupping or the Lancet whenever he perceives any Fulneſs, particularly at Spring and Fall. For if theſe Rules are neglected, the *Schirrus* and Cancer eaſily return.

CHAP. XVIII.

Of an OEDEMA.

An *Oedema*, what.

I. HITHERTO we have been treating of Tumors that ariſe from Inflammation, and of the ill Conſequences that attend them. We proceed now to deſcribe that Sort of Tumor which is attended with Paleneſs, Cold, and yields little Reſiſtance, retaining the Print of your Finger when preſſed with it, and accompanied with little or no Pain. The Name proper to this Tumor is *Œdema*, or a *Phlegmatic Tumor*. It obtains no certain Situation in any particular Part of the Body, ſince the Head, Eyelids, Hands, ſometimes Part of the Body, ſometimes the whole Body is afflicted with it. When the laſt mentioned is the Caſe, the Patient is ſaid to be troubled with a Cachexy, *Leucophlegmatia*, or Dropſy: But if any Part of the Body is more ſubject to this Diſorder than another, it is certainly the Feet; which are at that Time called ſwelled

ſwelled or œdematous Feet. We ſhall treat diſtinctly of them in this Place, that it may appear what is the true Nature and rational Treatment of Phlegmatic Tumors, in whatever Part of the Body they ſhall be found.

II. The proximate Cauſe of an *Œdema* is doubtleſs to be found in the too great Seroſity or Viſcidity of the Blood, which ſtagnates in the very minuteſt Veſicles of the Fat, or *Tunica Celluloſa*, and by this means ſtretches out the Skin with which it is immediately covered. This vitiated State of the Blood chiefly ariſes in Men, (1.) who are either of a cold and phlegmatic Habit of Body, or are advanced in Years: It chiefly falls upon them in cold Weather, or in the Winter, when the Inclemency of the Seaſon heightens the Diſorder of Nature. It is no wonder therefore that Perſons whoſe Legs ſwell greatly in the Day, frequently find themſelves much lighter and ſlendered in thoſe Parts every Morning, which certainly proceed from the Warmth they receive in Bed. (2.) Another Cauſe of this Diſorder is, *an Irregularity in Diet*, by over eating or drinking, and by the conſtant Uſe of crude, cold, and hard Meats. (3.) *Intermitting Fevers or Agues* conduce very much to this Diſorder: Eſpecially if the Patient indulges himſelf in an intemperate Uſe of cooling Liquors whilſt the hot Fit is upon him, and his Thirſt very urgent. (4.) This Diſeaſe frequently owes its Riſe to *too plentiful a Diſcharge of Blood* from a Wound, from the Noſe, or Lungs, by vomiting, or from the hæmorrhoidal Veſſels or *Uterus*. Or, (5.) Sometimes to *Obſtructions of the menſtrual Diſcharge* in Women. Or, (6.) To *a Compreſſion of the Vena Cava*, by the Weight of the *Fœtus* in Women far gone with Child, or by any ſchirrhous Body in the *Abdomen*; which greatly hinders the Return of the Blood from the lower Limbs. Or, (7.) To *too ſedentary a way of Life*, or to too great an Indulgence in lying in Bed or ſleeping. Or laſtly, (8.) To a *Phthiſis and Difficulty of Breathing*; or to any other Diſorder or Fatigue of Body, which diſturbs or deſtroys the natural Force of the Heart in maintaining the Circulation with due Vigor. *Cauſes.*

III. From what has been delivered, it plainly appears by what Signs an *Œdema* manifeſts itſelf. Therefore this Obſervation alone remains to be added; that the harder the Tumor is, and the longer the pitting which is made by the Finger remains viſible, the ſtagnating Fluid is in ſuch Proportion thicker and more tenacious. *Diagnoſis.*

IV. Œdematous Tumors that come with other Diſeaſes, as a Dropſy, Conſumption, Aſthma, Intermitting Fever, or with an Increaſe or at the going off of the menſtrual Diſcharge, can ſeldom be cured but by curing the Diſtemper from whence they ariſe. Œdematous Tumors of the Legs are of very little Conſequence in Women with Child; eſpecially if they are naturally of a good Habit of Body: For the Preſſure being taken off the *Vena Cava* by the Delivery of the Woman, the Tumor quickly diſappears in Conſequence. But weakly Women do not come off ſo well in this Caſe, particularly if the Tumors remain long after Delivery: For they are, in this Caſe, frequently the Forerunners of Dropſy, Aſthma, and Death. The more inveterate theſe Phlegmatic Tumors are, by ſo much the more dangerous and doubtful are they to be eſteemed. On the other hand, thoſe that are recent and attended with no other Diſeaſes are very eaſily cured. Thoſe that are Attendants on an Intermitting Fever, are cured with much greater eaſe, than thoſe which are the Conſequence of a large Profuſion of Blood, or of any other Weakneſs. Thoſe which ariſe from an *Prognoſis.*

Obſtruction

Obſtruction of any natural Diſcharge, are cured by the Return of that natural and cuſtomary Diſcharge of Blood. Young Perſons are more readily cured of theſe Tumors in the lower Limbs than old: For indeed Perſons advanced in Years are generally incurable in this Caſe. When Tumors of the Legs and Feet are treated with improper Remedies, eſpecially externally, Aſthma and Death will, by Degrees, be the neceſſary Conſequences.

Method of Cure.

V. The Method of treating œdematous Tumors is ſurprizingly different, according to the different Cauſes to which they owe their Riſe. Therefore we are firſt to make diligent Search after the genuine Cauſe of the Diſorder before we attempt its Cure. And as from the Nature of the Diſtemper, the internal Parts are to be ſet right, we muſt by no means put our whole truſt in external Remedies; but are chiefly to expect Help from internal Medicines preſcribed by a *prudent Phyſician* [a]. The external Method of treating theſe Tumors in the Legs and Feet, is uſually, (1.) To have Recourſe to frequent *Frictions* with warm Cloths, to be repeated Morning and Evening till the Parts grow red and hot. (2.) Then the Limbs are to be diligently preſerved from the Injuries of the cold Air: For which end he may wear Stockings made of ſome warm Furr; and at Night he ſhould keep hot Bricks about his Legs and Feet, to attenuate the Blood. (3.) After this you may apply a proper Bandage, which is to aſcend gradually from the Feet up to the Knees: This ſtrengthens the Limb, and prevents a Collection and Stagnation of the Blood in any Part of it. (4.) After the Uſe of proper internal Medicines, and the external Methods which we have juſt mentioned, it will be very proper to uſe ſtrengthening Remedies externally. To this end you may place the Limb over burning Rectified Spirits of Wine, wrapping it up in Cloths, in ſuch a Manner that it may receive the Steam: This will incline the ſtagnating Fluids to eſcape through the Skin, or render them fit to return into the Circulation, and at the ſame time reſtore the natural Tone to the Limb. (5.) Many, eſpecially amongſt the common People, apply, as a Family Medicine, the *Chelidonium majus*, firſt bruſing it, and then laying it on as a Cataplaſm. Others apply in the ſame Manner the *Perticaria acris*, either alone, or mixed with the forementioned Remedy, and from this Method they frequently find great Relief: For they are very active Medicines, and powerful Reſolvents. There are ſtill others again who uſe *Raphanum Ruſticanum Raſum*, or *Lepidium*, which they boil in Wine and apply hot for the ſame end. But the moſt excellent Remedy to execute this Intention ſeems to be the Cataplaſm which is prepared *ex Columbarum Fimo, Sale atque Aceto inter ſe invicem commixtis, calidè ſæpius impoſitum.* Of the ſame Virtues are Fomentations made *ex Cineris Querni Lixivio parat. cum Aq. Fabri Ferrar. addendo Spirit. Vini uncias aliquot, Aluminiſque portiunculam.* This may be applied with Stuphs, or the Legs may be bathed in the Liquor as warm as it can be well borne, twice every Day. *Aqua Calcis* is ſaid to be of equal Service, uſed in the ſame Manner either alone, or mixed *cum Spiritu Vini & Alumine.* The following Mixture alſo anſwers the ſame Intention:

℞. *Spirit. Vini, Aceti Vin. ana* ℔ j. *Alum. Crud.* ℥j. ſ ſ *Vitriol.* ℥j. *M.*

This is to be applied as we directed above. But you muſt carefully take notice, that after rubbing and fomenting, the Legs are to be well covered with Bandages

[a] See my *Practical Compendium, Chap.* II. *N.* 14.

and

and Stockings. The Patient ſhould drink ſparingly, uſe moderate Exerciſe frequently, and be very diligent in the Uſe of proper internal Remedies. Sometimes the medicinal Waters, particularly thoſe of the ſulphureous Kind, are found very ſerviceable in this Caſe, but not always. GARENGEOT adviſes ſcarifying the Feet, firſt in the inward and middle Part of the *Tibia*; and when thoſe Wounds are healed, afterwards to repeat it on the oppoſite Side: And to apply to them the *Emplaſtrum Norimbergenſe*, as a moſt excellent Medicine: Cap. *De Paracenteſi Abdominis*. HARRIS, a celebrated *Engliſh* Phyſician, in *Diſſert. Chirurg.* IX. relates, that he has cured the moſt dangerous of theſe Caſes, *cum Croco Marte aperitivo, Cortice Peruviano miſt.* Others affirm, they have done it with the *Cortex* alone: others again are confident, that this is a hurtful and dangerous Method. The beſt Way is, to conſult ſome prudent Phyſician, who beſt knows how to adviſe you what Methods to purſue, and what to avoid.

CHAP. XIX.

Of [a] FUNGOUS TUMORS, *and* DROPSY *of the* JOINTS.

I. *OEDEMATA* are nearly reſembled by fungous Tumors of the Joints. A fungous Tumor, what. Theſe are Diſorders of very bad Conſequence, and therefore deſerve a particular Diſquiſition. That they have been entirely ommitted or ſlightly paſſed over by many Chirurgical Writers, ſeems to proceed from their Ignorance of the true Cauſe from which they ariſe: For whether they owe their Origin to a Collection of Blood or ſerous Fluids, corrupted Matter, *Pus*, *Flatus*, or to any other Cauſe; they could not pretend to diſtinguiſh. When we ſpeak of a *Fungous Tumor of the Joints*, we mean that Tumor of the Limb which ariſes at the Joint, looks pale, is void of Heat and Pain, eaſily yields to the Preſſure of the Fingers, but riſes again inſtantly, like a *Fungus* upon removing the Finger, leaving no Pit behind. Though no Joint either of the upper or lower Limbs can be ſaid to be ſecure from this Diſorder, yet the *Knees* are moſt ſubject to it, becauſe they abound in a large Quantity of Fat and glandular Bodies, which are concealed amongſt the Ligaments and Tendons: There are ſeveral Species of this Tumor: For ſome are ſmaller, ſome larger, ſome ſofter, ſome harder, ſome more, ſome leſs glutinous with regard to the State of the inſpiſſated Fluid; and as they are particularly ſubject to Injuries from Falls, or other Accidents. Again, ſome are attended with Pain, ſome entirely free from Senſation. [b] In ſome the noxious Humours are ſituated without the Joint, which Kind of Tumors are properly the fungous Bodies we are now treating of: But in others they are collected and retained in the Joint itſelf, as the *Serum* is contained in the Teſticle in an *Hydrocele*, many of which I have ſeen and cured. This laſt-mentioned Diſorder may not improperly be called a *Dropſy of the Joint*, and may probably be diſtinguiſhed from the fungous Tumor of the Joint, by the Inlargement that ap-

[a] In *England* they are known to us by the Name of White Swellings, or Scrophulous Tumors of the Joints.

[b] PURMANNUS, in his *Chirurgia Curioſa*, has given us a Deſcription of a very large *Fungus*.

pears all round the Joint; whereas the fungous Tumor is situated more on one or the other Side of it. From what has been already said of these two Cases, I think it plainly appears, that it is no difficult Matter to distinguish one from the other.

Causes. II. The proximate Cause of fungous Tumors is, without doubt, the viscid glutinous *Serum*, which is found about the Ligaments of the Joints, and is apt to stagnate after the Ligaments have received any considerable Violence from a Fall or Blow. Sometimes the Tumor rises in the external Parts, sometimes in the Articulation itself, by which the Ligaments being weakened, the Part loses its natural Motion. But when the Nerves or Blood-vessels are greatly pressed upon by the Tumor, the Parts below are usually deprived of Nourishment, and the Joints by Degrees being greatly inlarged, the neighbouring Parts diminish and waste.

Prognosis. III. We have already observed, that in fungous Tumors of the Joints, the Ligaments are too much lengthened and relaxed, and the natural Strength and Motion of the Limb are lessened in proportion to the Degree of the Disorder. And as the lost Vigor of the Part is very difficult to be restored, and the Tumor will not readily yield either to Suppurants or dispersing Remedies, any one will be sensible that the Surgeon has no easy Task upon his Hands, when he undertakes the Cure of a fungous Tumor upon the Joint. The Suppuration of the Part is not only difficult to bring about, but it is generally a very dangerous Attempt: For by this Means *Caries* and incurable *Fistulæ* are sometimes produced, which require Amputation of the Part. When the Tumor is recent, and not very large or hard, it sometimes admits of Cure by the Application of digestive and corroborating Remedies: Whereas they will be greatly irritated by emollient Applications. But where the Tumor is large and inveterate, no Success is to be expected from any thing but the Knife: And even that is sometimes unequal to the Cure, or improper. If the noxious Fluids are contained in the Joint, they may be let out by Incision: But upon healing the Wound, the Tumor will generally return.

Cure of recent fungous Tumors by Dispersion. IV. In order to render the Cure of recent and mild fungous Tumors the easier by dispersing Remedies, it will be best to rub the disordered Part well every Day with warm Cloths, fomenting it afterwards with *Spirit. Vini tartarisat.* This Method is to be constantly observed, till the natural Strength and Form of the Limb are restored. PURMANNUS's Fomentation is excellently callulated for this Purpose:

℞. *Muriæ Halecum* ℔ ij. *Acet. Vini fortissim.* ℔ j. *Fol. Salv. M.* ij. *Vitriol. Rom.* ʒj ß. *Alumin. Crud.* ʒ vi. *M.*

These Ingredients are to boil together for half an Hour, and to be used in the Manner we have above described. When the Tumors begin to disperse, and the Parts to recover their Strength, it will be very beneficial in perfecting the Cure, to foment the Limb well several Times every Day *cum Spiritu Vini Tartarisati, vel cum Oleo Tartari fætido*; laying on the Bandages immediately afterwards to keep the Part warm, and defend it from the Injuries of the cold Air, of which it is very susceptible. Lastly, I cannot help adding a Form under this Head, by the Assistance of which I have frequently made very happy Cures of fungous Tumors:

℞. *Lithar-*

℞. *Lithargyr.* lib. ß. *Boli Armen.* ℥j. *Maſtichis, Myrrhæ ana* ℥ ß. *Aceti Vini* lib. j. *m. & coque hæc omina per horæ quadrantem, tinctiſque in iſt decocto linamentis craſſis calida ſemper & matutino & veſpertino tempore in lectulo applicentur.*

At the ſame time proper purging Medicines, Attenuants, and Sudorifics ſhould be diligently attended to.

V. If the fungous Tumor is of long ſtanding, and will not give way to the diſperſing Remedies which have been preſcribed, almoſt the only Hope left is, to make an Inciſion into the dependent and moſt convenient Part of the diſeaſed Joint, taking great Care to avoid wounding the Ligaments or Tendons. You are well juſtified in following this Method, by the Examples of thoſe two celebrated Surgeons [a] WURTZIUS and [b] PURMANNUS. By this means the ſtagnated *Serum* is inſtantly evacuated, if it is contained in one Cavity; but if it is contained in different Cells, it will all eſcape in a few Days. Tents daubed with ſome digeſtive Ointment, and ſprinkled with Allom, are ſerviceable in this Caſe. Before you make your Inciſion, you ſhould pull the Tumor down as low as you can with your Fingers, and make a tight Bandage above to retain it in this Situation. By this means the moſt convenient Part for the Inciſion to be made in, will lie fair; and when the Opening is made, the *Serum* will readily burſt out like Blood at the opening a Vein, or Lymph in tapping for the *Hydrocele* or *Aſcites*. When this is done, if any Tumor ſtill remains, dreſs the Part with *Emplaſtrum Diachylum vel Oxycroceum, vel* WURTZII *Rubrum, vel Aqua Calcis, vel Spirit. Vini*; by continuing any of theſe Applications, what remains inſpiſſated in the Tumor will entirely diſperſe. When the Limb is reſtord to its natural Shape, heal the Wound with vulnerary Balſams, diligently avoiding the Uſe of fatty or oily Medicines, as being very hurtful to the Tendons and Ligaments, with which thoſe Parts abound. If the *Serum* contained in the Tumor is ſo glutinous, that it cannot diſcharge itſelf for want of Fluidity, you muſt throw up attenuating Injections at every Dreſſing. The beſt calculated for this Purpoſe are thoſe which are prepared *ex Decocto. Agrimoniæ, Ariſtolochiæ, aut Alchymillæ cum Roſarum aut Chelidonii Melle miſto.* Injections of this Kind will quickly diſſolve the ſtagnating *Serum*, and diſperſe the Tumor.

Cure of inveterate Fungus's (1.) by the Knife.

VI. Though thoſe fungous Tumors, which are opened with the Knife, are more readily diſcharged and healed, yet ſome Surgeons prefer the Application of cauſtic Medicines to the Knife, diſcharging the collected *Serum* upon the falling off of the Eſchar: After which they proceed in the ſame Manner which we adviſed above. Whilſt the Part is healing, in either Caſe, I think, it would be very proper to warm and invigorate the Ligaments and Tendons, eſpecially when the Injury falls upon the Knee, by the Uſe of ſome nervous Ointment, or aromatic Spirit.

(2.) By Corroſives.

VII. It very frequently happens, that after you have evacuated the inſpiſſated *Serum*, and cicatriſed the Wound, you ſhall have a freſh Collection of a vitiated and corrupt Fluid, which I am an experienced Witneſs of. To prevent this Accident, the following Method will be ſerviceable. Let the Patient continue in a ſtrict Courſe of proper purging, ſudorific and attenuating Medicines, and

Remedies to prevent the Return of the Tumor.

[a] *Chirurg.* p. 268. [b] *Chirurg. P.* III. p. 46. *it. Chirurg. Curioſ.* p. 622.

keep the Wound open with Tents for a conſiderable Time, cleanſing it every Day by throwing up an Injection prepared in the Manner we directed in the preceding Section. PURMANNUS highly commends this Manner of keeping the Wound clean, and atteſts, that after the ſixth Time of Injecting, he has not only ſeen the Wound clean, but filled up with new Fleſh. It will be proper alſo to inject *Aqua Calcis vivæ*, or *vulneraria Gallorum* ſometimes; and to cover the external Part with a warm Plaſter, or to foment it with ſome Liquor of the ſame Intention, eſpecially in the Knees. This Method is recommended by that experienced Surgeon FELIX WURTZIUS, as the moſt likely Means of preventing the Return of the Diſorder.

When an Opening is not to be made.

VIII. Before I leave this Head I muſt inform you, that *it is not every fungous Tumor of the Joints which is ſo ſituated, that it can be opened with Safety.* For if the Tumor is of very long ſtanding, hard, of a great Size, or the Patient is of an infirm weakly Habit of Body, you muſt entirely lay aſide the Knife. For this Method of Treatment would produce more Miſchief than Good, by laying a Foundation for new Diſorders; to wit, *Caries*, *Fiſtulæ*, and *Gangrene*. As to the other Species of lymphatic or phlegmatic Tumors, which require the Knife, ſuch as *Dropſy*, *Hydrocele*, *Hydrocephalus*, and *Ranula*, I ſhall treat more fully of them in their proper Place, when I come to deſcribe Chirurgical Operations. In the mean time, with regard to Swellings in the Knee, conſult SCULTETUS's *Obſervat.* 79. WURTZIUS's *Surgery*, p. 268. and MECKEEN and ROONHUYSEN, *Obſerv. Chirurg.*

INSTITUTIONS OF SURGERY.

PART I. BOOK V.

Of ULCERS.

CHAP. I.

Of ULCERS.

I. AN Ulcer is a Diſorder ſo well known to every one, that when I have mentioned the Name, it would be impertinent to illuſtrate it with a Deſcription. A Definition in this Caſe would only ſerve to make the Matter more obſcure. You have a very juſt and clear Notion of an Ulcer, when you are told, that it is a *Solution of the ſoft Parts of the Body and the Skin*, ariſing from an internal Cauſe, *ſc.* and Inflammation, Abſceſs, or ſharp Humours. Wounds alſo and Contuſions, by length of Time, degenerate into Ulcers, and properly aſſume that Name. An Ulcer, what.

II. The proper Seat therefore of an Ulcer, is, any ſoft Part of the Body, *ſc.* the Skin, Fat, Glands, Muſcular Fleſh, and even the *Viſcira*. If any of the hard Parts of the Body, that is, of the Bones, are ulcerated or corroded, the Diſorder is rather called a *Caries* or *Spina Ventoſa*, than an Ulcer. But from the Similitude there is between both Caſes, I think they may very properly be treated of under the ſame Head, and I have therefore joined them together. Its Situation.

III. If you deſire to know how Ulcers differ from *Abceſſes*, *Contuſions*, and *Wounds*, a diligent Examination into the Nature of each, will give you full Satisfaction upon this Head. Though *Wounds* and *Contuſions*, as well as *Ulcers*, conſiſt in a *Solution of Continuity of the ſoft Parts of the Body*, yet they widely differ in this Circumſtance: To wit, Wounds and Contuſions always ariſe from an external Cauſe, and are produced in a Moment: Whereas Ulcers owe their Riſe chiefly to internal Cauſes, § I. and come on by ſlow Degrees. *Abſceſſes* are as it were the firſt Beginnings of Ulcers, or rather are immature Ulcers: Which is the Caſe when Inflammations come to Suppuration, the Skin ſtill remaining whole. But as ſoon as an Opening is formed in the Skin, and the maturated *Pus* diſcharges itſelf, from Abſceſſes they become Ulcers, whether the Skin is eroded by the *Pus*, or the Opening made by the Surgeon's Inſtrument. Difference from other Diſorders.

Various Kinds of Ulcers.

IV. Ulcers cannot be confined to one Species, for they differ, (1.) In the Part of the Body which they infeſt. For ſometimes they are found in the Skin, Fat, and Glands, ſometimes in the Muſcular Fleſh. (2.) In their Size; for they are ſpread wide, others occupy but a ſmall Space: Some are deep, others ſhallow: Thoſe which penetrate deep, and are narrow, particularly if they are very ſmall at their Opening, are called *Sinuſes* or *Fiſtulæ*. (3.) In their ſtanding; whence they are called *recent* or *inveterate*. (4.) In Number and Degree of Symptoms, or accidental Diſorders that attend them: Some are very mild, and are thence called *benign*: Others are *malignant*, that is, either *attended with very acute Pains*, or *fetid*, *putrid*, *fatty*, *diſcharging great Quantities of Ichor*, *ſpreading wide*, *cancerous*, *callous*, *fiſtulous*, or *attended with Worms*. (5.) In their Cauſes: Hence Ulcers are called *ſcorbutical*, *venereal*, *cancerous*, *peſtilential*, or are ſaid to be occaſioned by *Faſcination*. Laſtly, (6.) Ulcers differ in their Situation, and are called *Ulcers of the Noſe*, *Fauces*, *Breaſt*, *Anus*, and *Fiſtulæ Lacrymales*, as they attack this or that Part.

Cauſes.

V. I think thoſe Phyſicians amongſt the Moderns, draw too haſty a Concluſion, who aſſert, that the *principal Foundation of Ulcers* is owing to a *foreign acid Humour*, which corrodes and deſtroys the Parts of the Body which it falls upon, in the ſame Manner that *Aqua fortis* would: Since there is no acrimonious Humour, whether it is of a ſalt, luxivious, alcaline, or acid Nature, but would corrode the Body, and raiſe an Ulcer of ſome kind. And, to ſay Truth, the ſtagnating Blood generally degenerates into an Acrimony of the alcaline Kind, and is by no means, according to the Opinion of ſome, converted into an Acid: This you may collect from the fetid Smell of Ulcers. The Phyſicians have pronounced an *Alcali* to be any Saltneſs or Acrimony, which is adverſe to all Kinds of Acids, as Salt of Tartar is to Vinegar, Oil of Tartar *per deliquium* to Spirit of Vitriol. As there are many Kinds of Poiſons, ſo of acrimonious Things, and therefore of Ulcers. The more Virulence the Acrimony is poſſeſſed of, by which the Body is corroded, ſo much the worſe will be the Conſequence of ſuch Corroſion: The Ulcers will be the more fetid, the more dangerous, and perhaps incurable, which is the Caſe in Cancers. But Ulcers do not ariſe from Acrimony alone; but from any other Cauſe by which the Blood may be made to ſtagnate and corrupt. Upon this Principle you frequently ſee *Tumors*, *Inflammations*, *Wounds*, *Contuſions*, *Fractures*, *Luxations*, *Schirrhus*, *Cancer*, and *Caries* degenerate into Ulcers: Which though they begin with very ſlight Symptoms, yet, either from a bad Habit of Body, Irregularity in Diet, or Ignorance in the Surgeon, they very often become extremely dangerous.

Diagnoſis of inveterate Ulcers.

VI. Although moſt Ulcers may be diſcovered by the Sight: Yet, in order to have a thorough Knowledge into the Depth and Tendency of the *Sinus*, and whether it is accompanied with a *Caries* of the ſubjacent Bone, you muſt have Recourſe to the Uſe of the Probe. You will learn beſt from the Patient whether it be recent or of long ſtanding. From him alſo you may collect the Cauſe of the Inveteracy of the Diſorder; whether it is owing to a ſubjacent *Caries*, to an irregular Courſe of Life, or to the unſkilful Treatment of the Surgeon. The Ulcer is ſaid to be *benign*, if it is recent, and attended with no violent Symptoms; if the *Pus* is of a moderate Conſiſtence, whitiſh, without Acrimony, and of no bad Smell; and laſtly, if the Patient is otherwiſe healthy, and of a good Conſtitution. On the contrary, it is called *malign*, if the Patient is of a weakly

ſcorbutical, or hydropical Habit of Body; if the *Pus* is too fluid, acrimonious, fetid, yellow, brown, green, or blackiſh, or of the Conſiſtence of Lard. The Diſorder is equally dangerous, where the Patient ſuffers very intenſe Pain, or where the Ulcer is ſo formed that it cannot admit of being treated like Wounds and recent Abſceſſes, with Digeſtives and vulnerary Balſams.

Nature of putrid, running, corroding, fiſtulous, and callous Ulcers.

VII. *Ulcers* are ſaid to be *unclean and putrid*, in which the Fleſh appears corrupted, ſoft, white, yellow, or livid; where the Matter is thin and glutinous, and at the ſame time green or variegated. They are called *running* or *rheumatic Ulcers*, when there is a very plentiful Diſcharge of a thin *Sanies*. We term them *Corroding and Spreading Ulcers*, if the Matter is corroſive enough to deſtroy the adjacent Parts, ſometimes ſlower, ſometimes faſter, in proportion to the Degree of Acrimony of which it is poſſeſſed. *Fiſtulous Ulcers* are thoſe which penetrate deep, under the Skin, or between the Muſcles, eſpecially if the *Sinus* is wide, and the Opening very narrow. In *callous Ulcers* the internal Parts are lined with a hard and almoſt cartilaginous Subſtance.

Nature of venereal, cancerous, carious Ulcers, and of thoſe which are occaſioned by Charms.

VIII. *Ulcers* are termed *venereal*, when they are the Conſequence of Familiarity with an infected Perſon, and either accompany or ſucceed other venereal Diſorders. They are confined to no particular Part; but more frequently ariſe in thoſe Parts which are the Seats of venereal Bubos, or in the Noſe or Throat, ſometimes alſo upon the *Penis*: Ulcers of this laſt-mentioned Part are called by the *French*, *Chancres*. In the other Sex the *Labia Pudendi*, or Neck of the Womb, are chiefly obnoxious to this Symptom of the Pox. *Cancerous Ulcers* are either Cancers themſelves burſt out, the Sign of which we have given you above, in *Book* IV. *Chap.* XVII. § V, VI. or very nearly approach the Nature of *Carcinomata*, if you regard the Degree of Pain with which they are affected, or the Quickneſs of their Increaſe. *Ulcers* are called *carious*, when any neighbouring Bone is deprived of its *Perioſtæum*, or affected with a *Caries*. But we ſhall treat more fully of this Caſe below. *Ulcers* are, by the Vulgar, believed to ariſe from *Faſcination*, when Needles, Hairs, Threads, Rags, Egg-ſhells, Coals, or any preternatural Body of this Kind is found in an Abſceſs or Wound. But in good Truth, it is my Opinion, that not only the Sign by which the common People pretend to diſcover Charms, but even Faſcination itſelf, is an Impoſition which can be ſwallowed by none but Perſons loaded with Superſtition. For many Ulcers have been ſaid to be owing to Faſcination and Witchcraft, which have evidently proceeded from natural Cauſes.

Prognoſis, of malignant inveterate Ulcers.

IX. Recent and benign Ulcers, like recent Abſceſſes, are generally attended with no great Difficulty in the Cure; eſpecially if they happen to young and robuſt Subjects. The Difficulty of the Cure will ariſe in proportion to the Malignity of the Symptoms and the Inveteracy of the Diſorder. Therefore *putrid*, *running*, *fiſtulous*, *callous*, *carious*, and *cancerous Ulcers*, require great Skill and Addreſs in the Cure. Thoſe quackiſh Perſons who boaſt of a ſecret Plaſter, or Ointment, for the Cure of Ulcers of ever ſo great Inveteracy, or attended with the worſt of Symptoms, egregiouſly impoſe upon themſelves and their credulous Patients. If the Patient is weak and infirm, advanced in Years, has great Acrimony in his Blood; if the Ulcer has a very offenſive Smell; if the *Pus* is of a bad Colour and full of Acrimony; any of theſe Circumſtances will render the Cure of the Ulcer very difficult. If there are many Ulcers, or if an Ulcer ſpreads very wide, the Diſcharge will be very plentiful, and reduce the Patient wonderfully. It is never good Practice to heal old Ulcers of the Legs, eſpecially

eſpecially in weak Habits, or in Perſons advanced in Years. For Experience teaches us, that they are always in the beſt State of Health whilſt this Drain is kept open in their Legs: But if you heal the Ulcer, and ſtop up the Diſcharge, the worſt of Diſorders follow, to wit, Pains in the Head, Vertigines, Apoplexy, Epilepſy, Difficulty of Breathing or Aſthma, Diarrhœa, Dyſentery, and Inflammations on the internal Parts, and many other Diſorders of this Kind, till Death brings up the rear. That excellent Phyſician CRATO deſerves to be conſulted upon this Head, in his *Epiſtolæ Medicæ*, where he treats this Point very judiciouſly. Where inveterate Ulcers dry up upon old Subjects, and the Lips grow hot and livid, there is immediate Danger of *Sphacelus* and Death itſelf. The Cure of inveterate Ulcers is much eaſier in young and robuſt Subjects; but you will always find it a uſeful and indeed neceſſary Obſervation to you, that in Ulcers of this Kind, you are not only to remove the immediate Cauſe of the Diſorder, but you are alſo to reſtore the Blood to its priſtine Purity: And in doing this you will uſually meet with great Difficulty. Therefore if the Diſorder is very inveterate, and the Patients are tired with the continual Uſe of Medicines, and with the ſtrict Regimen to which they are enjoined, it is no wonder if theſe Ulcers often fail of a Cure, even in robuſt Perſons.

Prognoſis, of venereal, fiſtulous, callous, carious, and cancerous Ulcers.

X. *Venereal Ulcers* cannot be cured till you have thrown the venereal Poiſon out of the Body by proper Remedies: Till you have done this, external Remedies are to no purpoſe. *Fiſtulous*, *callous*, and *carious Ulcers*, are never cured without the Knife: For if you heal the Ulcer and bring on a Cicatrix, it will burſt out again, and afflict the Patient with greater Vehemence. A Caries, eſpecially if it is large and ſituated in the Joint, will bring on ſo large a Diſcharge of Matter, that if the Limb is not taken off in Time, the Patient will be entirely run down. This will appear very plain to you when you read what will follow in its Place, on the *Caries* and *Spina Ventoſa*. The ſame may be ſaid of cancerous Ulcers: For if the Part affected is not taken off, there remain no hopes of Cure, as we declared above, treating of a *Cancer*. But even after taking off the Part, Cancers frequently return, and entirely deſtroy the Patient. When Ulcers fall upon the *Viſcera*, they are generally deemed incurable, becauſe out of reach, both of the Hand and of immediate medical Applications.

Cure of recent Ulcers.

XI. The Method of treating Ulcers differs greatly according to the different Nature of the Diſorder. When the Ulcer is quite recent, it may be treated as a recent Abſceſs or Wound. Firſt, therefore it is to be cleanſed, then to be filled with new Fleſh, and laſtly to be covered with an even Cicatrix.

(1.) How the Ulcer is to be cleanſed.

XII. The Ulcer, if recent, is to be cleanſed in the following Manner: Firſt, the Matter is to be diſcharged; if it does not flow freely enough of itſelf, you muſt preſs it gently with your Fingers: If there is a deep *Sinus*, you may cleanſe it with an Injection, or, if it lays fair enough, with Lint. Any ſmall Membrane or fatty Body, that remains corrupting at the Bottom of the Ulcer, will readily enough caſt off afterwards, at the Removal of every Dreſſing, which ſhould be a digeſtive Ointmet ſpread upon Lint, and ſecured upon the Part with *Diachylon*, *Diapalma*, or any other Plaſter of that Kind, covering the Whole with proper Compreſſes and Bandages. This Method is to be continued till the Ulcer appears to be entirely cleanſed, that is, till the Fundus of it becomes florid, and it appears to be filled with new Fleſh.

XIII. Having proceeded thus far, the next Intention is, to fill the Ulcer with new Fleſh. This Intention is ſatisfied with thoſe Medicines which are vulgarly called *Sarcotics*. The beſt of this ſort appears to me to be the common *Unguentum Digeſtivum*: For where there is no remarkable Impediment, I have never found it neceſſary to uſe any other ſarcotic Remedy than this. It is not eaſy to ſay what ſhould induce almoſt all Phyſicians to cry up certain balſamic Remedies as having a peculiar Virtue in generating new Fleſh. Beſides, our Digeſtive is endued with a true balſamic Power: but to ſay the Truth, the Generation of new Fleſh is not ſo much owing to the Uſe of any particular Medicines, as to the Benefit of Nature. The whole Buſineſs of the Surgeon in this Caſe is, only to remove any thing that may impede the Cure. If any ſhall think that the *Unguentum Digeſtivum* is not equal to this Intention, they may have my free Conſent to ſubſtitute in its room *Balſamum Arcæi*, *Balſamum Peruvianum*, *Balſamum de Mecchâ*, *Balſamum Sulphuris*, *Eſſentia Myrrhæ & Aloës*, *Oleum Myrrhæ per Deliquium*, *Oleum Ovorum*, or any vulnerary Balſam of this Kind, 'till the Wound is entirely healed. (2) How the Ulcer is to be filled up.

XIV. If the Ulcer penetrates very deep, ſo that you can neither reach the Bottom of it with your Eye, nor apply your Medicine to it, it will then be proper, at every Dreſſing, as ſoon as you have preſſed the Matter out of it, to inject ſome cleanſing healing Liquor to it; ſuch as *Decoctum Agrimoniæ vel Ariſtolochiæ cum Melle Roſarum, vel & Myrrhæ atque Aloës Eſſentia miſtum*; or that which BELLOSTE cries up, in his *Hoſpital Surgeon*, *Decoctum ex Nucum Foliis cum admixto Saccharo*. This Method of injecting is to be continued till the Bottom is entirely healed: Afterwards you may proceed to fill up the Ulcer in the Manner we adviſed above. What is to be done in deep Ulcers.

XV. The Ulcer being filled up with new Fleſh, it remains that we bring on a proper Cicatrix. This is beſt done by dreſſing the Part daily with dry Lint, till the Cicatrix is formed. But if, notwithſtanding this Method of dreſſing, the Fleſh becomes luxuriant, and the Ulcer is moiſt, it muſt be ſprinkled with drying Powders, *ex Maſtiche*, *Thure*, *Sarcocollâ*, *Colophoniâ*, *Lapide Calaminari ac Tutiâ*, covering it with dry Lint, and ſecuring all with ſome Plaſter, till it is entirely healed. But if the luxuriant Fleſh has grown above the Skin, the beſt way is, to eat it down with *Vitriolum Cæruleum*: Or if that is not ſtrong enough, you may uſe the *Pulvis ex Præcipitato Rubro atque Alumine uſto* till it becomes quite even. Then you may proceed as directed above. (3) How the Cicatrix is to be formed.

XVI. Laſtly, it is ſcarce poſſible to ſay what great Relief the Patient will receive from obſerving a proper Regimen with regard to his Diet. Practitioners in Surgery have in all Times obſerved, that Ulcers of the moſt malign Kind have been ſometimes cured by this means, almoſt without the Aſſiſtance of any other Remedy: Whilſt on the other hand the moſt benign Ulcers have ſo far degenerated, as to become altogether incurable by an irregular way of living. In this Caſe therefore, the Patient ſhould moſt diligently avoid all acrimonious, ſalt, acid, fatty, or heating Meats, or thoſe that are hard of Digeſtion; according to the Directions which we gave you above when we were treating of *Wounds*. (*Book* I. *Chap.* I. § XLV, and the following.) If your Patient already labours under a bad Habit of Body, which obſtructs the Cure, it is your Duty to call for the Aſſiſtance of ſome ſkilful Phyſician, that may take off the conſtitutional Complaint, by preſcribing proper internal Medicines. A proper Regimen to be obſerved.

CHAP.

CHAP. II.

Of the Method of treating [a] FISTULOUS CASES.

The Cure of *Fiſtulæ* performed, (1.) By cleanſing.

I. WHEN you diſcover, either by your Eye or the Probe, that Ulcers are attended with *Fiſtulæ* [b] not yet become callous, your readieſt Way of curing them is, to lay them open with the Knife to the Bottom, if you can do it with Safety, and afterwards cleanſe and heal them. But ſince Patients are very unwilling to conſent to the Uſe of the Knife, you may cleanſe them with a proper Injection, or dreſs them with *Ung. Digeſtivum* upon Lint, as we adviſed in the foregoing Chapter. Many Surgeons are for conveying their Medicine to the Bottom by the Aſſiſtance of *Tents*; but as they are very apt to do Miſchief by their Hardneſs, or too great Length, bringing on a *Callus*, Inflammation, or too great Flux of Humours upon the Part: Therefore I think it moſt adviſeable either to throw them entirely aſide, or at leaſt to guard as ſtrongly as poſſible againſt any of theſe Inconveniencies, by making them very ſoft, and as ſhort as the Caſe will admit of. BELLOSTE, and MAGATUS before him, both Men of great Name in Surgery, have been ſo offended at the miſchievous Abuſe of Tents, that they have abſolutely forbid the Uſe of them: And I am ſo far from diſagreeing with theſe Authors, that I readily join with them in Opinion. I think the Uſe of Tents is never to be juſtified, but where the Opening of your *Fiſtula* is ſo ſmall, that you are in conſtant Fear of its healing: And even in this Caſe your Tents can ſcarcely be too ſhort, and ſhould be made of the ſofteſt Materials.

(2.) By Preſſure.

II. The next Thing to be obſerved in treating *Fiſtulæ* is, to preſs the *Fundus* as near to the Opening as poſſible. When the Ulcer is cleanſed, and the proper Dreſſings applied, you muſt clap a ſmall Compreſs, or a ſlip of Plaſter doubled up in the Form of a ſmall Compreſs, upon the Part where you judge the *Fundus* of the *Fiſtula* to be ſeated; ſecuring all with a Bolſter, Plaſter, and Bandage, as uſual. In rolling up, the beſt Method will be to place the Beginning of the Roller upon the *Fundus* of the *Fiſtula*; or at leaſt to make your faſtening tight upon that Part. This will direct the contained Matter towards the Opening, and the Bottom will heal before the Reſt of the *Sinus*. This happens beſt in *Fiſtulæ* of the upper or lower Extremities; eſpecially if the *Fundus* is in the upper Part of the Limb, and the Opening in the lower Part.

III. When *Fiſtulæ* penetrate ſo deep that you cannot come at the Bottom of them with your Dreſſings, you muſt inject ſuch ſort of Liquors as we adviſed in the foregoing Chapter. You may alſo very properly add the following:

℞. *Ung. Digeſtiv. ex Terebinth. & Vitell. Ovi parat.* ℥j ſ. *Mell. Vulgar. vel Roſar. vel Chelidon.* ℥j. *Spirit. Vini Vulgar.* ℥ix. *M. Vel,*

℞. *Decoct. Scord. vel Abrotan. vel Agrimon.* ℥viij. *Spirit. Vini Simpl.* ℥iij. *Elixir Proprietat. vel Eſſent. Myrrh. & Aloës* ℥j. *Mell. Roſar.* ℥ij. *M.*

Theſe are to be injected at every Dreſſing, and the Opening of the *Fiſtula* ſhould be kept cloſe, that the Medicine may be retained as long as poſſible, which will

[a] See FABRIC AB AQUAPENDENTE, MARCHETTI, and a Treatiſe by ASTRUC, who treat fully and judiciouſly on *Fiſtulæ* of the *Anus*.

[b] In *England* we call this Caſe a *Sinus*, never a *Fiſtula*, till it becomes callous.

haſten

haſten the Agglutination of the Part: Afterwards you are to proceed as we directed above, treating of *Ulcers*, *Chap.* I. § XIII. and the following.

IV. If the Method of Cure, which we have hitherto deſcribed, is unequal to the Intention of cleanſing and healing, you will find greater Aſſiſtance from the Knife than from any other Remedy; and that chiefly where the *Fiſtula* tends downwards, or takes a very irregular Courſe, ſo that the *Fundus* of it cannot be preſſed toward the Opening. In this Caſe, you muſt lay open to the bottom. Seldom cured without the Knife.

V. You ſhould gently paſs a grooved Probe or Director down the *Fiſtula*, and directing your Knife down the Groove, lay open the Fleſh and common Integuments as far as you think ſafe and neceſſary. All the Sinuſes of the *Fiſtula* being laid open, a free Paſſage is made for a Diſcharge of the corrupted Matter, and you can come at the diſeaſed Parts with your Remedies. This Operation may be performed without the Uſe of a Director, if your Knife has a Button at the Point. (See *Plate* V. *Fig.* 4 and 5.) Some divide the Fleſh with a *ſtrong Pair of crooked Sciſſors.* (*Plate* I. *Fig.* D.) But this Method of cutting is attended with far greater Pain and Inconveniency than the other, except the Skin and Fleſh are exceeding thin. Inciſion how to be made.

VI. If the Operation is ſucceeded by a large Diſcharge of Blood, which frequently happens; at the firſt Dreſſing you muſt fill up the Wound with dry Lint: Afterward you may dreſs with *Unguentum Digeſtivum cum Ægyptiaco*, *vel Præcipitato Mercurii Rubro*, till the Wound is cleanſed. Every thing elſe is to be done as we adviſed above, treating of recent Ulcers. The Method of treating *Callus*, *Caries*, and thoſe ſort of Diſorders which attend *Fiſtulæ*, ſhall be delivered ſeparately below. Celsus *Book* VII. *Chap.* IV. upon *Fiſtulæ* in general, and particularly on the *Fiſtulæ Coſtarum*, *Ventris*, *& Ani*, deſerves a diligent Peruſal. Conſult likewiſe Scultetus's *Armament. Chirurg.* and Muys's *Podalir. Rediviv.* p. 41, 42. What to be done after the Operation.

CHAP. III.

Of the Method of treating Stubborn Ulcers.

I. HITHERTO we have treated of mild and well-conditioned Ulcers. It follows that we now deſcribe Ulcers of a more malignant Nature, which will not admit of a Cure by any of the Methods we have hitherto laid down; From the Stubbornneſs of their Diſpoſition they are called in the medical Schools, *Ulcera Dyſepulotica*, *Chironia*, *Cacoëthica*, *Rebellia*, *Contumacia.* No Man in his Senſes will deny that they have all their proper Cauſes to which they owe this bad Diſpoſition. Theſe malign Ulcers uſually appear in Subjects of a bad, ſcorbutical, cachectical, and hydropical Habit of Body; or where you have the Pox, a *Caries*, or *Callus*, where there is great Acrimony of Blood, or a Cancer at the Bottom of the Caſe. Whoever expects to be attended with Succeſs in treating theſe Caſes, ſhould diligently ſearch out and extirpate, if poſſible, theſe Cauſes of the Diſorder. But this in moſt Caſes is ſo difficult, that it will foil the moſt experienced Surgeon or Phyſician: Nor will quackiſh Various Cauſes of Stubborn Ulcers.

Empirics get any Credit here, let them boaſt ever ſo long of the ſecret Virtues of their famous Plaſters and Unguents.

(1.) When there is a bad Habit of Body.

II. When you can diſcover nothing of a *Fiſtula*, *Callus*, *Caries*, putrid Fleſh, or of Worms concealed in the Ulcer, it owes its Obſtinacy to the bad Habit of the Patient, either from a Redundancy of a glutinous, acid, acrimonious, or bilious Quality in the Blood; or from ſome venereal Taint; or from Irregularity in Diet; or, in Women, from an Obſtruction of the menſtruous Diſcharge; in Men, of the Hæmorrhoids. In order to correct this vitiated Habit of Body, you muſt not only have Recourſe to internal Remedies, but muſt alſo inſiſt ſtrongly on a ſtrict Regularity in Diet. This is of ſo great Conſequence, that I have ſeen the worſt of Ulcers yield to a[a] proper Regimen of Diet, without the Uſe of one internal Remedy; only cleanſing them daily with proper Medicines, or dreſſing them with any common Ointment, Oil, or Balſam, covering the Dreſſing with any Plaſter in Uſe, as the *Emplaſtrum Saturninum vel Diapompholygos*; or indeed with the ſimple Application, of a Plantain Leaf, or Birthwort. With regard to eating and drinking, thoſe Things which ſet lighteſt upon the Stomach ſhould be preferred, and ſhould be given in very ſmall Quantities at a Time. For every thing that is too ſalt, acrimonious, acid, hard, or crude; all ſorts of Fat, Lard, or Swines Fleſh, every thing even of the lighteſt Kind taken intemperately, muſt be looked upon as Poiſon in theſe Circumſtances. Perſons of a ſanguine Habit ſhould avoid warm Things: Thoſe of a phlegmatic cold Habit, cooling Things. A proper Regimen or Abſtinence is very much aſſiſting in the Performance of the Cure, by attending diligently to the Application of proper external Remedies. Therefore the Ulcer ſhould be kept very clean; that the corrupt Matter, by lying long upon the Part may not get an additional Acrimony, and ſo occaſion the ſpreading of the Diſorder. After it is well cleanſed, it is to be dreſſed with *Unguentum Digeſtivum*, to which may be added, *Myrrha Maſtiche, aut Colophonia*; or a Decoction *ex Juglandi Foliis cum injecto pauco Saccharo*; or *Decoctum Viridis æris cum Vino*. In ſome Caſes, *Spiritus Vini Simplex, vel Aqua Calcis cum Linimentis immiſſa, vel Lapide Medicamentoſo* CROLLII *Roborata*, has great Power in healing and drying up Ulcers. If you diſcover any *Sinuſes* or *Fiſtulæ*, they are to be laid open; and to be cleanſed afterwards in the Manner we taught above, and to be healed with *Balſamum Peruvianum, Copaibæ, Sulphuris Terebinthinatum*, or with any other agglutinating Medicine. Laſtly, if internal Remedies are not neglected, there is no doubt but that the very worſt of Ulcers may generally be cured.

(2.) Running Ulcers.

III. When theſe ſtubborn Ulcers are accompanied with a large Diſcharge, there is Reaſon to apprehend that the Blood abounds with too large a Quantity of thin acrimonious *Serum*; and they are from thence called *Rheumatic Ulcers*. This cannot be drawn off more properly than by cathartic Medicines. Where the Strength will admit of it, your Intention may be executed by preſcribing Cathartics and Dieuretics, to be repeated frequently; at the ſame time cautioning your Patient againſt drinking too freely. *Millepedes præparati, Eſſentia Succini, Myrrhæ, Balſami Peruviani, Tinctura Tartari, Tinctura Antimonii tartariſata*, or any other Tinctures or balſamic Eſſences, of known Virtues for promoting the Secretion of Urine, are very properly preſcribed in this Caſe.

[a] Amongſt many others, conſult DOLÆUS in his *Encyclopædia* upon this Subject.

Large

Large and frequent Draughts of ſmall Liquors, which are frequently the Cauſes of theſe Diſorders, are diligently to be avoided. On the contrary, ſtrong Ale, old Wine is to be uſed, but ſparingly, for common Drink at Meals: But the Patient ſhould drink nothing between Meals. With regard to a proper Choice for Diet, thoſe Meats are beſt which have the ſeweſt Juices in them, and are moſt roaſted: Flummery, Calves Feet, and Calves Foot Jelly are very proper Diet. The external Medicines after proper Evacutions, ſhould be thoſe that obtain the greateſt Reputation as Dryers. The principal of theſe are, *Aqua Calcis*, *Lapis Calaminaris*, *Tutia præparata*, *Creta*, *Maſtiche*, *Thus*, *Colophonium*, & *Cinnabaris Nativa*. When you have ſprinkled any of theſe finely powdered upon the Ulcer, you are to lay over it the *Emplaſtrum Diapompholygos*, *Saturninum*, *vel de Lapide Calaminari*.

IV. Ulcers which ſpread and corrode the neighbouring Parts, are in the Medical Schools called *Phagedænic Ulcers*, and betray a great Degree of Acrimony in the Blood: which is to be temperated as much as poſſible by the Phyſician, by the Uſe of lenient Medicines. The principal among theſe are, *Decocta ex Rad. Chin. Sarſaparill. Symphyt. Polypod. Lignit. Scorzon. Lapath. acuti*, *Herb. Malv. Alth. Hyperic. Sanicul. Agrimon. Marrub. Alb.* and the like. With regard to Diet, you may obſerve the Directions we gave above at § III. All ſeaſoned Meats are bad in this Caſe. The Patient will receive great Relief by taking a purging Medicine ſometimes with the Addition of ſome *Mercurius Dulcis*: This will not only leſſen the foul Diſcharge of the Ulcer, but will alſo deſtroy the Acrimony of the Blood, and forward the Cure. The ſame external Remedies are to be uſed here as we recommended at § II, III. eſpecially with the Addition of Mercury. The Uſe of them is to be diligently obſerved, till the Cure is perfected. (3.) Phagedænic Ulcers.

V. *Cutaneous Ulcers* that attack the Skin of Adults as well as Infants, particularly about the Face, approach very near to the Nature of Phagedænic Ulcers. For they not only ariſe from an Acrimony in the Blood, but are apt alſo to ſpread abroad. Therefore in both theſe Caſes, thoſe Medicines will prove moſt effectual which keep open the Bowels, and ſoften the Acrimony of the Blood. (§ III and IV.) Adults in particular ſhould be adviſed to drink freely of what we call the Decoction of the Woods, or *Decoctum Radicis Lapathi acuti*, *aut Herbæ Fumariæ*. Either of theſe Decoctions ſhould be drank by the Patient to the Quantity of ℥ viij. or ℥ x. three or four Times in a Day, as hot as he can bear it. The firſt Draught ſhould be taken in Bed, and a Sweating ſhould be endeavoured to be raiſed. To theſe you may very properly add *Eſſent. Fumariæ*, *Lignorum*, *Succini*, *vel Tinctura Antimonii tartariſata ad guttas* xxx *vel* xl. You may alſo preſcribe abſorbent Powders to be taken with theſe Decoctions, *ex Antimonio & Flor. Sulphur. parat.* A proper Regimen of Diet ſhould be ſtrictly obſerved in this Caſe. *In Infants Caſes who are yet at the Breaſt*, you ſhould preſcribe Medicines that will conſtantly keep the Body open and alleviate the Acrimony of the Blood: And at the ſame Time the Mother or Nurſe ſhould obſerve the Courſe we have preſcribed above, and be very exact in her Diet. With regard to external Application, you will receive great Benefit from *Oleum Tartari per Deliquium*, if you dip a Pencil or Feather into it, and dawb the Part three or four Times every Day, either with this alone, or with the Addition of *Oleum Ovorum atque Ceræ*. Over this you muſt lay a Plaſter, as the *Empl. Saturninum*, (4.) Cutaneous Ulcers.

turninum, vel de Minio, vel de Spermate Ceti cum Camphora, to correct the Acrimony, and to prevent Injuries from the external Air. If the whole Face ſhould be affected, which is frequently the Caſe in Infants, a Plaſter will be very improper: But you may make a Linen Maſk, ſuch as we deſcribed above, treating of Burns. You will find the Uſe of the following Medicines in this Caſe, by no means to be deſpiſed; *Ol. Philoſophorum cum Oleo Ovorum, necnon Aqua Calcis, vel & Aqua ex edulcoratione Antimonii Diaphoretici:* The Ulcer ſhould be daily waſhed and cleanſed with one of theſe. If you pleaſe, in the room of theſe you may anoint the ulcerated Parts with *Unguentum de Lithargyrio vel Diapompholyg. vel de Enula,* with which in very ſtubborn Caſes may be mixed *Argenti Vivi vel Mercurii Præcipitati Rubri portiuncula.* If theſe Ulcers are attended with a large and foul Diſcharge, it will be proper to ſprinkle them with ſome abſorbent or drying Powders, as *Pulv. Tutiæ, Lapid. Calaminar. Ceruſſa, Creta,* &c. *cum Cinnabari Nativâ, aut Præcipitato Rubro miſt.* Or you may work any of theſe up into an Ointment *cum Cremore Lactis,* and uſe it as ſuch.

(5.) Cancerous Ulcers.

VI. *Cancerous Ulcers* are the moſt grievous of all the corroſive Kind. In theſe Caſes the ſame internal and external Remedies are to be uſed which we directed for the ulcerated Cancer; (*Book* IV. *Chap.* XVII. § XII.) Nevertheleſs, according to the Opinion of that great Phyſician and Surgeon M. A. SEVERINUS, there is more to be expected from manual Operation than Medicine in this Caſe: For many have been cured by the Knife or actual Cautery, where Medicine has availed nothing. But whenever you ſhall think it adviſeable to uſe the Knife or Cautery, remember that you go to the Bottom, and leave no Part of the diſeaſed Matter behind you: If you ſhould, all your work would be in vain. Some preſcribe here an *Aqua Phagedænica* made in the following Manner: ℞. *Aq. Calc. Viv.* ℔ j. *Mercurii Sublimati* ʒ ß. *M. aut hujus loco Mercurii Præcipitati Albi* ʒj. *vel* ʒ j ß. which they apply upon Lint. Some make this ſtronger of the Sublimate; others add *Spirit. Vini* ʒj. *vel* ʒij. In the room of the Sublimate I have frequently ſubſtituted with Succeſs, *Mercurius Dulcis,* mixed with *Aqua Calcis,* which is a much ſafer Method. Digeſtive and balſamic Ointments are to be avoided in Cancerous Ulcers, as not only foreign to the Purpoſe, but extremely miſchievous.

(6.) Putrid and fetid Ulcers.

VII. When Ulcers are *putrid* or *fetid,* this Circumſtance ariſes either from the Patient's very bad Habit of Body, or from the Negligence or Unſkilfulneſs of the Surgeon. Therefore it is the Buſineſs of the Phyſician to correct the Habit, by the Adminiſtration of proper internal Remedies, and of the Surgeon to clean the Ulcer frequently, eſpecially if it is attended with intenſe Heat. For where Wounds are dreſſed and cleanſed but ſeldom, which muſt frequently happen in the Army after ſmart Engagements, where great Numbers are wounded, it can ſcarce happen but that the injured Parts will be annoyed with Heat, Putrefaction, or Worms. You cannot more readily prevent theſe Inconveniences, than by carefully dreſſing the Parts with *Unguentum Digeſtivum cum Ægyptiaco ſeu Fuſco* WURTZII *permixtum; aut Aqua Phagedænica; aut Mercurius Præcipitatus Ruber, vel ſolus, vel cum Alumine uſto miſtus, vel cum Unguento Digeſtivo ſubactus.* Theſe Dreſſings are to be continued till the putrid Fleſh ſeparates and leaves the *Fundus* of the Ulcer with its own natural roſy Colour. Whilſt this is doing, it will be proper to cover the Part with Lint dipped in Spirits of Wine, which is a very powerful Remedy againſt Putrefaction.

When

When the putrid Parts are caſt off, you muſt proceed in Healing as you do in other Caſes: But Myrrh ſhould be particularly added to the healing Medicines, as a moſt excellent balſamic. The Surgeon ought always to take Care in this Caſe to call in a ſkilful Phyſician, who, by proper Remedies, may keep up his Patient, and preſerve him from ſinking before the Cure is perfected. Ulcers attended with Worms are to be treated in the ſame Manner: For whatever prevents Putrefaction, will deſtroy Worms.

VIII. Some Ulcers are ſo very malign and obſtinate, and notwithſtanding they have no Alliance with any veneral Taint, yet they will not yield to any of the foregoing Remedies. When this happens, the only Method of Cure is, by adminiſtring mercurial Medicines, or raiſing a gentle Ptyaliſm, as I have frequently experienced. For ſome Men's Blood is ſo foul, that their Ulcers will not even be palliated, much leſs cured, without the Aſſiſtance of Mercury. But if they ſhould be attended with any venereal Diſorders at the ſame time, the Uſe of Mercurials will then be abſolutely neceſſary, as we ſhall ſhew in the next Chapter. Some Ulcers require Salivation.

CHAP. IV.

Of the Method of treating VENEREAL ULCERS[a].

I. VENEREAL Ulcers, as we have already declared, are almoſt always ſituated in the *Inguina*, after the Suppuration of venereal *Bubos*; or, in the *Prepuce*, *Frænum*, or *Glans Penis*, which is uſually termed a *Chancre*: In Females they are frequently ſituated upon the *Vagina*, or *Labia Pudendi*. Sometimes the Noſe, Palate, Lips, Fauces, Tongue, and *Uvula*; ſometimes the *Os Frontis* and other Bones of the Head, and elſewhere, are ſubject to them. If they are neglected or ill-treated, one Ulcer of this Kind will produce an univerſal Pox. Therefore the principal Intention to be obſerved in this Caſe is, to expel the venereal Poiſon by proper Remedies, both internal and external. Seat of Venereal Ulcers.

II. The Cure by internal Medicine, is to be performed by the Adminiſtration of purging Powders or Pills mixed with *Mercurius Dulcis*. You may alſo adviſe your Patient at intermediate Times to drink Decoctions of the Woods, or to take *Eſſent. Lignorum*, *Pimpinell. Alb. Succin. Tinctura Antimonii*, &c. in a proper Vehicle. Theſe Medicines have great Efficacy, if you take them before you riſe in the Morning, and encourage a moderate Sweat. A ſtrict Regimen to be obſerved in Diet, is very neceſſary. Wine, and all vinous or ſpirituous Liquors, Aromatics, Spices, Salt, acrimonious or acid Things, are Poiſon in theſe Circumſtances. If the Diſorder has acquired ſo great a Degree of Inveteracy, that theſe Medicines are not equal to the Cure; you muſt have Recourſe to the ſtrongeſt Sudorifics, eſpecially to ſtrong Decoctions of the Woods: Or you may give Mercury in ſuch Quantities as to raiſe a Salivation, by which you will cure both the Ulcers and the Pox which was the Cauſe of them. Internal Treatment.

III. Whenever the Ulcers are ſituated in the Mouth, *Uvula*, Fauces, Tonſils, or Tongue, external Remedies become neceſſary as well as internal. The Patient ſhould frequently uſe a Gargle, made *ex Decocto Lignorum*, *vel ſimplicis*, *vel melle* External Treatment.

[a] On this Subject read ASTRUC *De Morbis Venereis*.

Roſarum

Roſarum temperato. The vitiated Part ſhould often be touched *vel Aqua viridi* HARTMANII, *vel Roſarum melle cui ad Lenem uſque acorem, Spiritus Vitriolis pauxillum inſtillatum eſt:* After this it is to be healed, *per Eſſent. Succini et Myrrhæ, vel per Oleum Myrrhæ per Deliquium.* If the Ulcers appear on external Parts, it will be proper to deſtroy them with *Unguentum Digeſtivum aut Baſilicon Mercurio vel vivo vel albo aut rubro præcipitato permixtum*; theſe Dreſſings are to be covered with the *Emplaſtrum de Ranis* VIGONIS, or with the *Diachylon cum Mercurio.* When the Ulcer is cleanſed, you may dreſs with the Eſſences we adviſed above, or ſprinkle it with the abſorbent Powders we have ſo often recommended, (ſee *Chap.* I. *N.* XV.) but you muſt add a ſmall Portion of red Præcipitate. An equal Power with the foregoing, in cleanſing and healing theſe Ulcers, is held by the *Aqua Phagedænica, vel Aqua Calcis Mercurio dulci imprægnata.* Either of theſe may be applied frequently every Day, touching the Part ſometimes with the *Lapis Infernalis*, or *red Præcipitate.* When the Ulcer is thoroughly cleanſed, you may heal either after the Method recommended by HARRIS *in Diſſertat. Chirurg.* that is, with a ſimple Ointment compoſed *ex Mercurio vivo cum Tereb. q. ſ. ſubactum:* Or you may uſe the following *Formula:*

℞. *Ung. Mundificativ. vel Diapompholyg. Mercur. crud. pauca Terebinthin. extinct. ana* ℥j. *vel* ℥ *ſs. M. in Mortario Vitreo.*

℞. *Amalgam. Mercur. et Stanni* ℥j. *Bol. Armen.* ℥ij. *Ung. Roſat. q. ſ. M. f. Ung.*

If at the ſame time you have a *Caries* of the Bone, you are to treat it with the Remedies which we ſhall deſcribe below at *Chap.* VIII. particularly *cum Euphorbio vel oleo Caryophyllorum, vel Aqua Phagedænica, vel Spiritu Nitri, in quo Mercurius ſolutus fuerit*; or laſtly, if you can do it with Safety, apply the actual Cautery. Sometimes, when theſe Ulcers fall upon the ſoft Parts of the Body, particularly on the *Inguina*, they ſpue out ſuch large Quantities of Lymph, that all the Medicines you can invent, for cleanſing or drying them up, will avail nothing. This is occaſioned by the Rupture or Eroſion of ſome lymphatic Veſſels. In this Caſe, we ſhould try what we can do by the Application of proper [a] Compreſſes and a tight Bandage. But if theſe afford you no Aſſiſtance, you muſt call the actual Cautery in Aid, and apply it frequently, with caution, to the vitiated Parts.

Venereal Ulcers attended with great Danger.

IV. If venereal Ulcers of the *Penis*, or its *Glans*, are negligently treated, and univerſal Pox will frequently be the Conſequence; the *Urethra* will often be perforated in various Places, and the Urine be diſcharged as through a Sieve. Sometimes the whole *Glans* and *Penis* will be eaten off, or ſo miſerably afflicted with *Schirrhus* and [b] *Cancer*, that you will be forced to extirpate them with the Knife. When the Noſe is affected with theſe Ulcers, it is frequently demoliſhed by them. The Diſorder in this Part is called *Ozæna*, of which we ſhall treat more fully when we come to deſcribe *Chirurgical Operations.* Sometimes the Palate with its Bones are ſo eroded and perforated, that an open Communication is made between the Mouth and Noſtrils; that the fluid Part of our Aliment makes its Way out at the Noſe. Theſe Paſſages can ſcarcely ever be cloſed again, eſpecially if they are large: But when the Extremities of them are healed, they may

[a] In this I have followed RUYSCH, *Obſ. Chirurg.* 41. with Succeſs.

[b] Conſult RUYSCH *Obſ* 30. *et* DOEBEL. *Hiſt. Penis Cancroſi.*

be

be closed with a small [a] Plate of Silver or Gold. The Tonsils, the external Coat of the *Uvula*, and the whole *Uvula* are very frequently destroyed by the Virulence of these Ulcers. Decoctions of the Woods and Mercurials are the principal Antidotes to this Poison. Lastly, the *Cranium* itself, particularly on the Frontal Bone, is frequently, as I have often seen, so eroded and perforated by a *Caries*, that the Brain lays bare, and you may plainly see the Pulsations of the Arteries; from whence arise grievous Symptoms, and frequently Death, unless timely prevented by a proper Method of Cure.

CHAP. V.

Of Callous Ulcers.

I. THE Cure of a *Callous* Ulcer is attended with great Difficulty: To say the Truth, it will admit of no Cure till the *Callus* is extirpated. A *Callus* may be extirpated three Ways. The mildest Method which is to be used to a recent *Callus*, that is not yet become very hard, is performed by *corrosive Medicines*, and those of the mildest Kind. Amongst many others you may use *Alumen ustum*, *Præcipitat. rub.* either separately, or mixt in equal Proportions, or made up with *Unguentum digestivum*, or *Basilicon*. The *Unguentum Ægyptiacum seu Fuscum* Wurtzii will answer this Intention, especially if you add a little *Præcipitatum rubrum* to it. If the *Callus* does not yield to these Applications, you may destroy it with *Lapis Infernalis* or *Butyrum Antimonii*. The same End is also well answered by the Medicine which is made by a Solution of *Argentum Vivum in Spiritu Nitri vel Aqua Forti*. A recent Callus how to be treated.

II. Le Dran has taught us a still milder Method of destroying Callosities, *in Observat. Chirurg. N.* CXV. *Tom.* II. which is as follows: For four or five Days he applies a Plaster, made *ex Emplastro Diachyl. cum Gummis, et Vigonis cum quadruplici Mercurio, ana:* And this he renews Morning and Night, in order to soften the Callous Lips in some Measure. After this he makes frequent Incisions that pass so deep as to penetrate through the whole Thickness of the *Callus*, and stops the Blood that succeeds these Incisions with dry Lint. Then he applies the same Plaster again to the Ulcer, so that it may touch the naked incised Lips. After about four Days he repeated the *Scarifications*, and this to a third or fourth Time, if it is necessary; that is, if they are not destroyed before. By this Method he affirms, that Callosities by Degrees give way, and a Cicatrix will succeed, without the Use of any other Remedy. I have often tried this Method, and with good Success. Le Dran's Method.

III. If *Callous* Ulcers are accompanied with *Fistulæ*, then the Sinus must be laid open, before we attempt to destroy the *Callus*, as we advised above when we treated professedly on *Fistulæ:* After this the *Callus* is to be consumed in the same Manner as we directed above. But if we shall think the Use of the Knife unsafe, or if the Patient will not admit it, it will be proper to form Tents, and daub them with *Unguentum Ægyptiacum vel Fuscum* Wurtzii, and thrust them up the *Sinus*. By this Method a *Callus*, that is not of long standing may be When Fistulæ are accompanied with *Callus*.

[a] See Part II. *Operat. on the Palate.*

destroyed;

deſtroyed; eſpecially if you dip the End of the Tent in *Præcipitat. rub. Lapid. Infernal. vel Butyr. Antimonii*, before you paſs it up the *Sinus*; and continue this Method till the *Callus* is deſtroyed. But when you cannot reach the *Callus* with the corroſive End of the Tent, you may uſe the following Method. You may inject *Aqua Phagedænica*, or a Solution of *Ung. Ægyptiacum aut Fuſcum* WURTZII *in Spiritu Vini*, up the *Sinus*, and cloſing the Aperture, confine it as long as you can conveniently; repeating it as you ſhall ſee Occaſion. When you have removed the *Callus*, the Ulcer may be cured in the Manner we have directed above *Chap.* II.

When the *Callus* is hard.

IV. Sometimes you will be obliged to uſe the Knife; as in *callous Ulcers* or *Fiſtulæ*, that are of long ſtanding, and have formed Variety of *Sinuſes*, where you can do nothing with corroſive Medicines: Or, where they affect and corrode the Nerves, or Veins and Arteries, and bring on violent Convulſions, or Hæmorrhages, before they affect the *Callus*. In this Caſe, the ſafeſt Way is to lay open the *Fiſtula* in the Manner we deſcribed above, (*Chap.* II. *N.* V.) taking great Care not to wound Nerves, Tendons, or Arteries. When you have laid open the *Sinuſes* of the *Fiſtula*, you may preſently deſtroy all the *Callous* Bodies, either by the Uſe of Corroſives, or by LE DRAN's Method, recommended at *N.* II; healing the Ulcer afterwards in the Manner we have already adviſed.

How a very bad *Callous* Ulcer is to be treated.

V. Laſtly, if even this Method of Treatment ſhall not anſwer the deſired End; if the Patient is well ſtocked with Strength and Courage; if the Situation of the Nerves and Arteries is favourable; you may cut out all the *callous* Parts with your Knife, or deſtroy them with the actual Cautery. This Operation, though attended with great Pain, will bring the moſt obſtinate *callous* Ulcer to the State of a recent Wound; and unleſs a Caries, bad Habit of Body, Pox, Scurvy, Dropſy, or ſome other conſtitutional Complaint is in the Way, it may be cured by the moſt common Remedies. Therefore there is no Reaſon why we ſhould fall into Admiration at, or doubt the Veracity of, M. A. SEVERINUS, when he affirms, that he has happily ſucceeded in the Cure of the moſt deſperate Ulcers, by this Method.

CHAP. VI.

Of ULCERS *ſuppoſed to be produced by* MAGIC *or* WITCHCRAFT.

Medicine foreign to this Caſe.

I. THE Remedies that PARACELSUS, HELMONT, AGRICOLA, and many others have, with great Induſtry, invented to cure Ulcers, which are the Effect of Magic, and always contain ſomething unnatural in them, as Thread, Nails, Needles, are entirely uſeleſs, and therefore ridiculous and abſurd. But if any are to be preferred to the reſt, we ſhould give the firſt Place to the following Remedies: *Folia Quernea, aut Salignea, Adianthum, Hypericum, vel Fuga Dæmonum, Mercurius vivus, Aſa Fætida.* Theſe are hung round the Neck, or applied in ſome idle Manner, ſo that they can do no Miſchief. Some preſcribe the Aſhes of a Witch that has been burnt: Others burn *Stercus Humanum*, and ſprinkle the Ulcer with the Aſhes. HEERIUS and HORSTIUS are high in the Commendations of *Unguentum de Viſco Corylino* CARICHTERI: MYNSICTH preſcribes his *Emplaſtrum Fætidum.* Others, different Remedies of equal Efficacy.

II. Thoſe Phyſicians who conſult their own Reputation, and the Health of their miſerable Patients, ſhall, I ſay, or infatuated Patients, will preſcribe natural Remedies, ſuch as are beſt ſuited to the Nature of the Ulcer, and the Patient's Habit of Body, as we have taught in the foregoing Chapters. For although we ſhould make ever ſo large Conceſſions, concerning the Power which Devils and Sorcerers are by ſome ſuppoſed to have over Men, yet we ſhould never be juſtified in aſſerting, that Diſorders thus produced, were not to be treated by natural Remedies, but that we ought to have Recourſe to ſuperſtitious, naſty, and ridiculous Methods of Cure. To ſay the Truth, thoſe Ulcers are uſually affirmed to be the Effect of Magic by unſkilful and ſuperſtitious Barbers and Medicaſters, which evade their Art, though at the ſame time they are eaſily to be cured by an experienced Surgeon, who can thoroughly inveſtigate the true Cauſe and Nature of the Diſorder. There have been, even amongſt the Surgeons, ill minded Men, who have falſely affirmed Ulcers to be the Effect of Magic, in order to inhance the Price of the Cure. What is to be done.

CHAP. VII.

The Method of treating old ULCERS, *eſpecially thoſe that affect the* LEGS.

I. ALTHOUGH there is ſcarce any Part of the Body free from inveterate and obſtinate Ulcers; yet the Legs are found to be much more ſubject to them than the reſt. As we before (*Chap.* III.) treated of malignant and inveterate Ulcers in general, we ſhall here only conſider thoſe which are ſeated in the Legs, or lower Extremities. But the general Cauſes of obſtinate Ulcers in the Legs, are almoſt always the ſame with thoſe of maligant Ulcers in general. For theſe, like the former, uſually ariſe either from a bad Habit of Body, too great Thinneſs or Acrimony in the Juices; or from being attended with Calloſity, and Caries of a Bone; or, laſtly, from the Obſtruction of ſome uſual Evacuation, as of the Menſes in Women, or from other Cauſes of the like Nature. In order therefore to remedy theſe Ulcers, the Surgeon ſhould give a particular Attention to their Cauſes, that he may be thereby led to a rational Treatment of them. In what the Cure chiefly conſiſts.

II. Before we enter into an Inquiry, what are the moſt likely Means to be uſed to cure theſe Ulcers, it will not be amiſs to examine, whether they can be healed without Danger to the Patient. For we are furniſhed with frequent Examples, in the Writings of Phyſicians of the greateſt Experience, where the worſt of Diſorders, and even Death itſelf, has been the Conſequence of healing theſe Ulcers. The Anſwer to this Queſtion, if I am not miſtaken, is very clear, from what I have delivered above, in *Chap.* I. N° IX. to wit, in Perſons advanced in Years, or labouring under an infirm Habit of Body, it is moſt adviſable not to attempt to heal them: Since they are in this Caſe to be looked upon rather as a Relief of Nature, than a Diſorder, as they ſerve to drain off all noxious Humours from the Body. But I would not have this Rule extended to young robuſt Subjects, without ſome very material Reaſon. For in theſe, the firſt Cauſe of ſtubborn Ulcers may be removed, by Abſtinence or a regular Way Whether Ulcers in the Legs may ſafely be healed.

of Living, by opening Fontanells, or by proper internal Remedies, without any Danger: And the Cauſe being removed, the Ulcer may be healed with great Safety.

What is to be obſerved in general, in old Ulcers.

III. Although we have declared above, that it is improper to heal inveterate Ulcers in old Subjects; yet I am very far from affirming, that no Care at all ſhould be taken of them. On the contrary, I think it abſolutely neceſſary that they ſhould be attended to. The Surgeon is to obſerve two things in this Caſe: Firſt, to relieve the Pain, and other violent Symptoms; next, to prevent the Ulcer from ſpreading, and new Symptoms from coming on.

Internal Remedies.

IV. In the firſt Place, Abſtinence and a ſtrict Regimen in Diet is to be obſerved. They ſhould abſtain from Pork, from all ſalt or ſeaſoned Meats, or of hard Digeſtion, and eat but ſparingly of the moſt innocent Food, Gentle Purges are to be frequently repeated, to carry off the redundant Humours by Stools. Proper internal Medicines are alſo to be preſcribed, ſuch as are moſt likely to remove the Cauſe of the Ulcer. In Perſons advanced in Years, balſamic and bitter Medicines are requiſite, to temper the violent Acrimony of the Blood: As *Elixir Proprietatis*, *Eſſent. Myrrh. Eſſent. Succini*, *Eſſent. Balſami Peruviani*, and others.

External Remedies.

V. With regard to the external Treatment of the Ulcer, Care muſt be taken that it be cleanſed from its Sanies, once or twice every Day. You may then dreſs it, either with dry Lint, or with Lint dipt in *Decoct. Fol. nucis Juglandis vel Ariſtolochiæ.* Over this you may lay the *Emplaſtrum ad Ulcera antiqua* BAUHINI, *Diaſulphuris* RULANDI, *Diapompholygos*, *Saturninum*, *de Lapide Calaminari*, or any other of this Kind. Theſe Rules being nicely complied with, if the Patient is well guarded from external Cold, and particularly from a moiſt or damp Air, there is no room to doubt but theſe Ulcers may become very mild, and convenient for the lengthening his Life. The Phyſicians amongſt the Antients, obſerving the ſalutary Effects of Ulcers upon old Perſons, thought Nature to be the beſt Guide, and therefore opened Fontanells in many Caſes, which anſwer the End of Ulcers, in draining off the noxious and redundant Humours.

How Inflammation and Pain is to be treated.

VI. Whenever Inflammations and violent Pains come on, as they frequently do, either from a Blow, or Cold, or putting the Leg into cold Water; or from Paſſions of the Mind, or Irregularity in Diet; it will be proper in this Caſe, firſt, to take away ſome Blood, in plethoric Conſtitutions: Then to apply a Linen Compreſs, dipt *in Aqua Reginæ Hungariæ vel Spiritu Vini Theriacali, aut Camphorato, vel & Aqua Calcis & Spiritu Vini Camphorato calidis.* The Patient ſhould keep his Bed, and defend the injured Limb as much as poſſible from Cold: And in the Morning he ſhould be ordered to drink plentifully of ſmall Green Tea, White Wine Whey, or any other ſmall Liquors that may be likely to promote a Sweat. By theſe Means the Inflammation and Pain will quickly go off. But there is great Danger, when the Patient is of a bad Habit of Body, if the Inflammation runs to a great Height, and begins to degenerate into a Gangrene. In this Caſe the ſame Remedies are to be uſed, both internal and external, which we preſcribed above when we were treating of a Gangrene (*Book* VI. *Chap.* XIV. N° V. *and the following.*) But above all, you are here to be very careful to keep up the Spirits of weak and aged Perſons with proper Remedies, (particularly the Bark) and to provoke gentle breathing Sweats. If theſe

Rules

Rules are neglected, there is very imminent Danger that *Sphacelus* and Death will by Degrees ſteal upon you.

VII. When theſe Ulcers dry up ſpontaneouſly, in old and infirm Perſons, a Horror, Nauſea, and a great Weakneſs uſually ſucceed, which declare Death to be at hand. (*Chap.* I. N° IX.) The firſt Intention is, to ſupport the remaining Strength of Nature as much as poſſible by proper Diet and Medicines. There ſhould inſtantly be applied to the Ulcer *Radix Gentianæ, vel Iridis Florentinæ contrita*; or if theſe ſhall be thought of too little Force, *Radix Hellebori nigri in Pulverem aut Globulos redacta*; or, laſtly, *Pulvis Cantharidum, aut Globulus ex Emplaſtro Veſicatorio Officinarum.* Theſe Applications will produce ſo great a Stimulus, that the Ulcer will frequently run again, to the great Relief of the Patient: When this happens, you muſt treat it as before. But when it reſiſts all Remedy, and ſtill continues dry, you have no Hopes of Life remaining. How to treat Ulcers that dry up ſpontaneouſly.

CHAP. VIII.
Of CARIES *of the* BONES.

I. THE *Caries* or Corruption of the Bone may very juſtly be eſteemed one of the principal Cauſes of the Depravity and Inveteracy of Ulcers. For you will find it ſcarce practicable to heal an Ulcer, or if you do bring it to heal, it will not remain long in that State, where you have a carious Bone concealed at the Bottom.

II. We call that Diſorder of the Bone a Caries, where the Bone, from whatſoever Cauſe it ſhall proceed, is deprived of its Covering, or *Perioſtæum*, and having loſt its natural Heat and Colour, becomes fatty, yellow, brown, and at length, black. This is the firſt and lighteſt Degree of this Diſorder, and is called by the Antients, according to CELSUS, *Lib.* VIII. *Cap.* II. *Os Vitiatum* and *Nigrities.* But the greater Degree of this Diſorder is, when the Bone is eroded and eaten, and becomes uneven like a Pumice Stone, from the Number of ſmall Holes, of which it is full; when it diſcharges a filthy Sanies, whoſe Acrimony ſoftens, relaxes, and deſtroys the fleſhy Parts that grow round it. This is a true *Caries*, or *Ulcer of the Bone*, and every Bone in the Body is ſubject to this Diſorder. And although this Ulcer may ſometimes appear to be very happily healed, yet, after the Cicatrix has been brought on for ſome time, you have an Abſceſs formed: The Diſorder will return afreſh, and the acrimonious corrupted Matter, which continually ſpues out from the carious Bone, being collected within, will produce various grievous Symptoms, ſuch as Shivering, Vomiting, and Fever, and deſtroy the neighbouring Fleſh again. A Caries, what.

III. There are many Names and Species reckoned of this Diſorder, and of others that bear a near Relation to it. For it is called a *Caries*, [a] *Spina Ventoſa* or *Spinæ Ventoſitas*, a *Gangrene* and *Cancer* of the Bone by [b] CELSUS, ſometimes by the *Greek* Term [c] *Teredo*, and ſometimes *Pædarthrocaces* [d]. Though ſome Au- Different Denominations.

[a] We have a Treatiſe on the *Spina Ventoſa*, by PANDOLPHINUS, an *Italian*, republiſhed with the learned Notes of MERCKLINUS, *Norimberg*, 1674. 12*mo.*

[b] See the Book laſt cited, *p.* 258. [c] Ibid. *p.* 64, 104, 143, 264. and the following.

[d] M. A. SEVERINUS treats on this Subject in his Book *De Abſceſſibus*, and there are ſeveral *Academical Theſes* on this Head, by different Authors.

thors conſtitute as many diſtinct Species of a *Caries* as we have reckoned up Names, yet I think there is not ſo material a Difference between them, that we ſhould multiply them into ſo many ſeparate Species. Therefore I think it beſt to diſtinguiſh them into two Sorts: The firſt where the Diſorder begins in the internal Part of the Bone; the other, on the Outſide, or from an external Cauſe. I would call this a *Caries*, and that a *Spina Ventoſa*: Or when it happens in Children, I would comply with SEVERINUS, and call it *Pædarthrocaces*. But of theſe we ſhall preſently treat more fully, in a particular Chapter for that Purpoſe, and explain their Differences more accurately.

Cauſes. IV. We find two Cauſes of the [a] *Caries* of the Bone. For, 1. A *Caries* ariſes, when the Bone is deprived of its *Perioſtæum*, by a Wound, Fracture, Bruiſe, or any other Accident, and either is expoſed to the Injuries of the external Air, or is corrupted by greaſy Dreſſings, or the common vulnerary Oils which are uſually applied to ſimple Wounds, ſuch as *Oleum Hyperici*, *Lilior. albor. Balſamum Samaritanum*, &c. Or, 2. A *Caries* ariſes, when the Fluids are interrupted in their Circulation, by any external Violence, or internal Cauſe whatſoever, from whence Inflammation and Suppuration ſucceed; by which the *Perioſtæum* and Bone ſuffer to ſuch a Degree, that the Veſſels which are ſent to theſe Parts for the Nouriſhment and Support of the Bone and *Perioſtæum*, being inflamed and corrupted, the Bone is brought into conſent, and ſoon becomes carious. This Diſorder, if not quickly remedied, ſpreads and communicates itſelf to the neighbouring Parts of the Bone, making the ſame Progreſs with Ulcers in the ſoft Parts.

Degrees. V. From whence it evidently appears, that there are ſeveral Degrees of Eroſion or *Caries* of the Bone. The firſt and mildeſt Degree is, when the Bone is laid bare, looks greaſy, and turns yellowiſh. But as ſoon as it becomes truly yellow, brown, or black, the incipient *Caries* degenerates into a worſe State. The third Degree is, when the Bone becomes uneven, rough, and rotten. The greater Eroſion the Bones have ſuffered, the more rough and uneven will they appear. When the *Cranium* is perforated through both Tables, or the *Tibia* or *Femur* are eaten through to the *Medulla*, this is a *Caries* of a very bad Kind. But the worſt Kind of *Caries*, where indeed the Caſe may almoſt be pronounced deſperate, is, that which falls upon the Joints, or any Parts of the Bones that lie deep: Becauſe you can have no Acceſs to it with your Hands, to clean the Bone, and the Caſe admits of no Remedy but Amputation of the Limb.

Diagnoſis. VI. A *Caries* may be diſcovered two Ways; as it is concealed, or as the diſeaſed Bones are expoſed to View. 1. When the Bones lie open to the Sight, the *Caries* diſcovers itſelf by the following Signs: The Bone looks greaſy, and degenerats from its natural Colour, to yellow, brown, or black; it is bare, and the *Perioſtæum* deſtroyed. If you apply your Finger or Probe to the Bone, it will diſcover itſelf to be rough, uneven, and ſpongy. 2. But where the Bone is covered with Fleſh, it will then diſcover itſelf by the following Signs: The Matter that flows from it will appear greaſy, brown, or blackiſh, and ſtink like rank Lard. When you take off the Dreſſings, they will be tinged with a blackiſh Hue, from the Colour of the Diſcharge: When you have room to paſs your Probe to the Bone (which is not always the Caſe) you will find it to be rough

[a] HAYNE, in his Book *De Oſſium Morbis*, treats ingeniouſly on the Formation and Cauſes of a *Caries*.

and

and uneven. The neighbouring Fleſh will appear flaccid, ſoft, looſe, ſpongy, and ſtink like rank Lard. Laſtly, in Caſes where you can neither ſee the Bone, nor get at it with your Probe, you may very reaſonably ſuſpect it a foul Bone, when the Ulcer frequently breaks out afreſh, after it has been healed, without any other manifeſt Cauſe; and eſpecially if any Fragments of Bone are diſcharged from it.

VII. From what has been laid down, it plainly appears, what Dangers the *Caries* is attended with, and what Event we may expect from each different Degree of it. Ulcers of this Kind give great Trouble in healing: They are very apt to ſpread, eſpecially where we cannot conveniently come at the *Caries* to deſtroy it: And when they are healed, they frequently break out again, as was juſt obſerved. Where the Diſorder increaſes, and extends itſelf to the Joints, particularly to the Knee, there is ſcarce any Remedy, but Amputation of the Limb. Where the Circumſtances are ſuch, that it ſhall not be thought adviſeable to take off the Limb, the Patient is followed with great Weakneſs and a feveriſh Diſorder, and by Degrees, with Death. Caries in the *Femur*, *Coccyx*, *Os Sacrum*, *Carpus*, *Tarſus*, and *Oſſa Palati*, meet with extreme Difficulty in the Cure. When the *Cranium* is affected with this Diſorder, it is frequently eat through even to the *Dura Mater*: From whence proceed acute Pains of the Head, great Watchfulneſs, Vertigo, a diſturbed Imagination, and many other Diſorders of that Kind, with great Danger of Death. *Prognoſis.*

VIII. With regard to the Cure of a *Caries*, many Methods have been attempted. [a] The firſt and mildeſt Method is applied to the ſlighteſt Degree of a *Caries*, and is performed by the Application of Spirituous Remedies; ſuch as *Spiritus Vini*, or *Aqua Reginæ Hungariæ*: With which Applications alone I have cured ſlight *Caries*. Or by Balſamics, ſuch as *Pulv. Ariſtolochiæ, atque Iridis Florentinæ, vel Pulv. Myrrhæ atque Aloës*. One of theſe Powders is to be ſprinkled upon the Part, after you have diligently wiped away the Sanies with dry Lint: This Method is to be continued till the diſeaſed Part of the Bone is caſt off, and new found Fleſh ſprings up in its ſtead. In a Caries that penetrates ſomewhat deeper, ſtronger Remedies take place: Such as [b] *Pulv. Euphorbii, vel Eſſentia Euphorbii, cum Spiritu Vini optimo parato, vel Oleum Coryophyllorum Cinnamomi aut Ligni Guaiaci*. Theſe may be applied with a Pencil, or ſpread upon Lint, and laid on the Part affected. Others apply corroſive Medicines, as the *Aqua Phagedænica, aut Spiritus Vitrioli aut Sulphuris*, and with the ſame Succeſs. In the room of all theſe, you may very well ſubſtitute, *Solutio Mercurii in Aqua Forti vel Spiritu Nitri*. We have enumerated theſe as the Principal, from a great many other Remedies of the like Nature, that have been preſcribed for the ſame End. We purpoſely paſs by ſuch as are either too weak for the Intention, or too vehement to be admitted with Safety: Such as *Arſenicum vel Mercurius Sublimatus* in Subſtance. When you have procured an Exfoliation of the diſeaſed Part of the Bone, your Buſineſs is, to complete the Cure with Balſamics: Therefore the next Dreſſings to take place, are, *Aqua Reginæ Hungar. Eſſentia Maſtich. Myrrhæ, Succini, Aloës, Ariſtolochiæ, Balſamum Peruvianum vel Capivi*, or any Balſam of this Kind: Cover theſe with a Plaſter, and proceed after- Cure 1. By Medicine.

[a] The Antients uſed the Cautery or Raſp in the ſlighteſt Caſes, as you may ſee in CELSUS, *Lib.* VIII. *Cap.* II. but at preſent we never uſe theſe violent Methods, but in deſperate Caſes.

[b] This is highly extolled by many. See MERCKLINI *Lib. De Spinæ ventoſitate*, p. 473.

wards as you are directed above in the Cure of Ulcers in general (*Chap.* I. N° II. *and the following.*) Le DRAN has given us Obſervations on *Caries* of the Bones very well worth our remarking: Particularly on a *Caries* of the Cubit, *Obſ.* 51, 52, 53. in the Loins, *Obſ.* 69. after the Small Pox, *Obſ.* 70. in the *Os Ilium*, *Obſ.* 95. in the *Trochanter major*, *Obſ.* 97. in the Knee, *Obſ.* 102, 103. and in the *Tibia*, *Obſ.* 104.

2. by the Trepan.

IX. A Second Method of Cure for a greater Degree of *Caries*, conſiſts in[a] perforating the Bone after it is laid bare, with the Trepan or Inſtrument deſcribed in *Plate* VII. *Fig.* 2. *or Fig.* 7. A. *or Plate* XV. *Fig.* 8. in the ſame Manner, as we adviſed in another Place to be done with the *Cranium*, after it had been laid bare by a Wound. *Book* I. *Chap.* XIV. N° 17. After this is done, the Part is to be dreſſed either with dry Lint, or with the Balſamic Medicines which we have recommended above. By theſe Means the Exfoliation of the foul Bone is forwarded, and new Veſſels puſh through the Foraminula that you have made, which joining with the neighbouring Fleſh, make a new Covering for the Bone.

3. By the Raſpatory or Chiſſel.

X. The third Method of Cure is performed by ſcraping away the diſcoloured or vitiated Part of the Bone, with a *Raſpatory* or Chiſſel (*Plate* VII. *Fig.* 3, 4, 5.) till all the corrupted Parts being deſtroyed, the Bone appears white or ruddy and ſound. CELSUS adviſes this Operation of raſping the Bone, to be done boldly and expeditiouſly. SCULTETUS is of Opinion[b], that you ſhould never begin to ſcrape, till the Bone lies fairly expoſed, or rather not till it begins to ſeparate from the ſound Parts; and that you ſhould dreſs the Part with nothing but dry Lint, till this happens: But this Rule is not conſtantly to be obſerved. Others in particular Caſes uſe a Chiſſel and Mallet, (*Plate* VII. *Fig.* 10, 11.) by the Aſſiſtance of which, they ſtrike off the corrupted Parts from the ſound. But both theſe Methods, N° IX, and X. have been pretty much neglected by the modern Surgeons. Though PETIT affirms, in his Book *de Morbis Oſſium*, when he is treating of a *Caries*, that where you have fungous Fleſh continually ſprouting up, the beſt Method is, to raſp the Bone, and afterwards to uſe the Cautery. In certain Tumors of the Bone, which are called by us *Spinæ ventoſæ*, which refuſe to yield to any medical Application, he adviſes not only to make frequent Perforations, but to take off the Tumors with the Chiſſel and Mallet. But we ſhall treat of this Caſe in the following Chapter.

4. By the Cautery.

XI. The fourth, which is the moſt antient, ready, and certain Method of Cure, eſpecially in the greater Degrees of this Diſorder, is performed by burning down the vitiated Part of the Bone with the actual Cautery. See different Sizes and Figures of Cauteries in *Plate* III. Great Care muſt be taken in performing this Operation, that you do not injure the Fleſh or other ſoft Parts that lie near. To prevent Miſchief of this Kind, your Aſſiſtant ſhould keep back the Lips of the Ulcer with his Hands: If the Opening is too narrow, it ſhould be enlarged with a ſponge Tent, or widened by the Knife, till the Bone lies fair. The Bone itſelf ſhould be well cleanſed with dry Lint: And if there is any fungous Flew, it ſhould be removed before you go to work with your Cautery. One Application of the Cautery will ſeldom be ſufficient for your Purpoſe, where the *Caries* is conſiderable: It muſt be frequently repeated, at longer or ſhorter Intervals as you ſhall think proper. If the *Caries* has ſpread itſelf

[a] See the Method of perforating, by CELSUS, *Lib.* VIII. *Cap.* ii, and iii.

[b] *In Armament. Chirurg.* pag. 42.

ſo

ſo wide, that you cannot deſtroy it with one Cautery, the firſt Iron ſhould be applied to the Middle of it, proceeding afterwards to its Lips. This Operation is not attended with great Pain, if you take Care not to hurt the ſoft Parts: For the Bones have no Senſe of Pain. [a] When the Bones of the *Cranium* are become carious, a cautious Surgeon will never riſque his Reputation on this Operation, from the apparent Danger there is of injuring the Membranes of the Brain, or the Brain itſelf. The ſame Caution may be obſerved in ſome other ſoft and ſpongy Bones, as in the *Sternum*, or a *carious Rib*, where for the like Reaſons the Cautery is to be avoided. The *Carpus* and *Tarſus* will not well admit of cauteriſing, and other ſpongy Bones of this Kind: And that more particularly from the Neighbourhood of the Tendons and Ligaments, which will neceſſarily be in great Danger of ſuffering.

What is to be done after cauteriſing.

XII. When you have cauteriſed the Parts in the Manner I have deſcribed, you ſhould dreſs at firſt with dry Lint: But if the Patient complains of a Senſe of Heat in the Part, you ſhould moiſten your Lint *cum Spiritu Vini*. You may afterwards dreſs with Balſamics, ſuch as we deſcribed above at *N.* VIII. till the Exfoliation ſucceeds: And the Vacuity will ſhortly be filled up with new ſound Fleſh, which will be a Teſtimony of the Recovery of the Part. But where it happens otherwiſe, and the Bone is left bare, uncovered with Fleſh; or if the Fleſh with which it is covered, is ſoft and ſpongy, and does not adhere ſufficiently to the ſubjacent Bone; or where the Bone remains diſcoloured; in either of theſe Caſes, your original Diſorder is not extirpated. In theſe Circumſtances your Work is to be done over again, the ſpongy Fleſh muſt be removed, either with the Knife or Cathæretics, ſuch as the *Alumen uſtum et Mercurius præcipitatus ruber*, or ſtronger, if they ſhall be found neceſſary: And the actual Cautery muſt be again called for, or you cannot expect your Cure to ſtand.

When a Caries penetrates to the *Medulla*, the Trepan is ſometimes neceſſary.

XIII. When the *Caries* penetrates even to the *Medulla* in the larger Bones, [b] PETIT adviſes us, after the Example of [c] MEEKREMIUS, to make a Perforation, or two, or more, in the Bone with the Trepan; and furniſhes us with an Inſtance where he made three Perforations in this Manner, in the *Tibia*, after he had tried the Cautery, and was juſtified by Succeſs. But this Method can ſcarcely be put in Practice upon any other great Bone than the *Tibia*, becauſe you will be obſtructed by the great Quantities of muſcular Fleſh which you will meet with. He further informs us, that the *Os Pectoris* or *Sternum* may be perforated in this Manner, to make a Paſſage for the Diſcharge of Matter, which is ſometimes confined under it; and to make Way alſo for the immediate Application of Medicines to the diſordered Parts. But the Performance of this Operation on the *Sternum* requires the greateſt Caution and Deliberation: Becauſe Reſpiration may be injured by it, or other grievous Diſorders may be produced. It is to be obſerved in this Place, that the Caries of the Bone which penetrates to the *Medulla*, or begins in the *Medulla* (which we term the *Spina Ventoſa*) does not always ariſe from an internal Cauſe, but frequently from an external Violence; by which the Veſſels which are diſtributed on the internal Part of the Bone are burſt, and Blood extravaſated. This by its Stagnation in the Cavity quickly forms *Pus*, erodes the Bones, and produces a Caries, which extends itſelf from the *Medulla* to the external Parts.

[a] CELSUS has given the ſame Caution, *Lib.* VIII. *Cap.* ii. *de Carie.* [b] *Lib. de Morb. Oſſium, cap.* [c] *Obſ. Med. Chirurg.* 72. *edit. Latinæ, &* 69 *Belgicæ.*

XIV. When

Admonitions of CELSUS.

XIV. When the Blackneſs or Caries extends to the other Side of the Bone, ſo that the whole Bone ſeems to be corrupted, CELSUS adviſes to take it entirely out, *Lib.* VIII. *Cap.* 2. 3. If the lower Part remains ſound, you muſt remove only as much as is corrupted. If a Bone of the *Cranium*, or the *Os Pectoris*, or one of the *Coſtæ* is carious, the Cautery is not to be uſed, but it muſt be cut out. And in this no Delay is to be ſuffered, but you are to take it out the Inſtant you have laid it bare, before any inflammatory Symptons come on, by which means you will do it with greater Safety. When a Cartilage is become carious, you muſt pare off the carious Parts with your Knife, according to CELSUS; to whom I am obliged for this Section, not having met with any modern Surgeon, who has treated ſo well on this Subject.

In what the Cure of a Caries conſiſts.

XV. Upon a diligent Attention to what has been delivered, we may very reaſonably conclude, that the principal Buſineſs in curing a Caries of the Bone, conſiſts in a ſpeedy Extirpation of the carious Parts of the Bone. This is done in very ſlight Caſes by the Application of *Spiritus Vini*, or *Aqua Reginæ Hungariæ*; in Caſes of more Conſequence, by a Solution of *Argentum Vivum in Aqua Forti:* But in Caſes of the laſt Conſequence, by the Cautery or Knife. The reſt of the Cure is performed in the ſame Manner as other Ulcers are treated, by the balſamic Remedies which we have ſo often recommended.

How Bones that are very rotten are to be treated.

XVI. Where the Bone is exceeding rotten, or where the Diſorder has communicated itſelf to the Joint, for Inſtance to the Knee, or to any Joint of the Arm or Leg, ſo that the vitiated Part cannot be extirpated, and the reſt of the Limb preſerved; you have only one Remedy left, and that a melancholy one, which is the Amputation of the diſeaſed Limb. Otherwiſe your Patient will drag on a miſerable Life: Yet at laſt perhaps worn down with Pain and Weakneſs, attended with a long Train of grievous Symptoms, he muſt yield to Death[a]. In the large Bones, where the whole Bone is not carious, but only Part of it, as the external Part of the *Maxilla*, *Os Humeri*, *Tibia*, or *Clavicle*; or any Part of the *Rib*, *Ulna*, *Radius*, or *Fibula*, &c. you muſt not immediately proceed to the Amputation of the Limb, but only remove, in the moſt convenient Manner you can, either by medicinal Applications, or by the actual Cautery, the diſeaſed Part of the Bone, dreſſing afterwards as we taught above at *Sect.* XII. till the Bone is covered with ſound Fleſh, and the Ulcer healed. Sometimes Part of the vitiated Bone ſeparates ſpontaneouſly from the reſt of the Bone. If you can lay hold of it, and the Ulcer is wide enough, you ſhould remove it with your Fingers or the Forceps: If the Ulcer is not wide enough to admit of this, you muſt enlarge it with your Knife. You will meet with a remarkable Caſe of this Kind in MEEKREM. *Obſerv. Chirurgic.* 66. *Edition. Belgic. et Obſerv.* 69. *edit. Latinæ*, where a large Portion of foul Bone ſeparated and caſt off from the Arm: And another in RUYSCH. *Obſervat.* p. 94. *ac Theſaur. Anatomic*, VIII. *Tab.* III. where the ſame Caſe happened in the *Tibia*.

[a] LE DRAN gives us ſeveral Inſtances of an Amputation in a *Caries*; particularly *Obſ.* 101, 102, 103, 104. But many of theſe Patients died, for the Reaſons juſt mentioned.

CHAP.

CHAP. XI.

Of the SPINA VENTOSA, PÆDARTHROCACES, *and* EXOSTOSIS, *which may be called* TUMORS OF THE BONES.

I. THAT Species of Corruption of the Bones, which takes its Riſe in their internal Parts, and by Degrees enlarges the Bone, and raiſes it into a Tumor, is at this Time called, by Phyſicians and Surgeons, a *Spina Ventoſa*, by ſome [a] *Spinæ Ventoſitas:* Though the Antients were entire Strangers to theſe Terms, and diſtinguiſhed them by the Names of *Sideratio*, *Gangræna*, or *Cancer Oſſis*, or ſometimes by the Word *Teredo*. Some amongſt the *French* call it an *Exoſtoſis* [b]. Though this Term more properly belongs to certain [c] Eminencies or preternatural acuminated Excreſcences in the Bones, which happen after a Fracture or other Accident, and are ſometimes accompanied with a *Caries*, yet I have frequently ſeen this Caſe of the Bones, and have now Bones of this Kind in my Collection, where there is not the leaſt Appearance of *Caries*. This Diſorder ſeems to have borrowed the Term *Spina* from the Reſemblance which the Eminences of the Bone in this Caſe bear to Thorns, continually pricking the Fleſh, and producing grievous Pains: And the Epithet *Ventoſa* is added, becauſe the Tumor appears upon touching to be filled with Wind or Air, though in Fact it is never, or [d] very ſeldom diſtended with Air. Afterwards ſeveral Writers, and particularly PANDOLPHINUS, barbarouſly diſtorted the Word into *Spinæ Ventoſitas*. *Spina Ventoſa*, what.

II. When this Diſorder happens to Children, many, with M. A. SEVERINUS, call it [e] *Pædarthrocaces*, from the *Greek* Words παις a Child, αρθρον, a Joint, and κακον an Evil: To ſignify that this Diſorder is moſt frequently found in the Joints of Children: For as the Bones of Children are ſofter and more ſpongy than the Bones of Adults and old Perſons, they are therefore ſo much the eaſier diſtended by Humours, and more frequently form [f] Tumors. SEVERINUS made another Diſtinction between the *Spina Ventoſa* and *Pædarthrocaces*. For ſome of theſe Tumors which we call *Spinæ Ventoſæ*, are very painful, frequently look red, and have all the Appearances of Inflammation: Others are free from Pain (at leaſt in any conſiderable Degree) in the Beginning, particularly in rickety Children, and theſe he called *Pædarthrocaces*. But at preſent theſe Names are pretty much confounded, and are deſervedly, as [g] MERCKLINUS has taught us, uſed for one and the ſame Diſorder; only with this Difference, that this Diſorder in Children begins with little or no Pain, but is almoſt always attended with Pain in its Progreſs. *Pædarthrocaces*, what.

[a] By the *Arabians*, witneſs JOS. PANDOLPHINUS, *Lib. de Ventoſitate Spinæ*.
[b] See MERCKLINUS, Annotations on PANDOLPHINUS, and what we ſaid above at *Sect.* III.
[c] See GORÆUS in *Definit.* JO. A. VIGO *in Chirurg.* and PETIT *Lib. de Morb. Oſſium, cap. de Exoſtoſi & Carie.* [d] MERCKLINUS relates a Caſe of this Kind, where, upon opening a Tumor, nothing was diſcharged but a Flatus, and the Patient died. [e] See M. A. SEVERINUS's Book *de Pædarthrocace*, contained in his excellent Work *De reconditâ abſceſſuum naturâ*; alſo the academical Theſes of AMMANNUS, TAUSIUS, MÆBIUS, CHUNIUS, and others. [f] Caſes of this Sort may be ſeen in M. A. SEVERINUS *de Abſceſſ.* p. 144. and p. 467. RUYSH. *Epiſtol. Anatomic.* XIV. BIDLOO *Exercitat. Exoſtoſi.* [g] *Lib. de Spinæ Ventoſitate*, p. 53, 54, 248, et ſeq.

Symptoms. III. There are other Names of a *Caries*, which we have recited above *Sect.* I. and in the foregoing Chapter *Sect.* III. which agree much better with this Diſeaſe of the *Spina Ventoſa*, than with that Diſorder, whith is vulgarly and ſtrictly ſpeaking called a *Caries*; as *Cancer Oſſis*, *Gangræna*, *Sphacelus Oſſis*, which Terms are frequently uſed by the Tranſlators of HIPPOCRATES; and the *Greek* Word [a] Τερηδων, which they tranſlate *Teredo*, from the Similitude of thoſe Worms which are called *Teredines*, which eat into and deſtroy Wood. It is very probable, that theſe are all ſynonymous Words for the *Spina Ventoſa*, different perhaps only in Degree: But I ſhall ſpend no Time in Defence of this Opinion, becauſe MERCKLINUS, in my Judgment, has ſufficiently demonſtrated not only this, but that the Diſeaſe itſelf was well known by the [b] Antients, contrary to the [c] Opinion of ſome. Whoever deſires farther Satisfaction upon this Head, may turn to this Writer's Notes on PANDOLPHINUS's Book, which we have ſo often quoted. Laſtly, we muſt obſerve in this Place, that PETIT, in his Book *De Oſſium Morbis*, *Chap.* XVI. ranks all theſe Names and Diſeaſes under the Name of *Exoſtoſis*, and at the ſame time entirely neglects to mention the other Names, which are more vulgarly known, and in conſtant Uſe amongſt medical Writers. Whether he has judged well in this Caſe, I leave others to determine. For my own Part, I ſhall chiefly uſe the Term *Spina Ventoſa*, as the moſt received Name amongſt us at this Time.

Differences. IV. But theſe Diſorders, particularly their *Differences* and *Degrees*, are, in my Opinion, not deſcribed with ſufficient Accuracy by moſt Writers. I intend to deſcribe them as clearly as I can; for great Numbers of theſe Caſes have fallen under my Care: And nothing can tend more to an Improvement in the Method of treating theſe Diſorders, than an accurate Knowledge of their Differences. A *Spina Ventoſa* is by us underſtood to be a Corruption and Eroſion, or Caries of the Bone, occaſioned by a Depravity of the contained Fluids, and ariſing generally ſpontaneouſly, without any external Cauſe, beginning, not upon the external Face of the Bone, but between its *Lamellæ* or *Cells*, or in its internal Cavity; and extending itſelf, by Degrees, to the external Parts, at length affects either the [d] whole Bone, or a [e] greater or ſmaller Part of it, expanding it to a greater Width, or raiſing it into a Tumor. (*See Plate* XII. *Fig.* 16. A. B.) It is frequently hard, and ſometimes without Pain; at other Times it appears as if it was filled with Wind, and is attended with a greater or leſs Degree of Pain, pricking, ſhooting, at laſt it grows red, and is attended with other bad Symptoms; till the diſordered Bone being, by Degrees, corroded, the common Integuments, and other ſoft Parts that lay over it, remaining at firſt entire, but at laſt partaking of the Diſorder, foul Ulcers of the moſt ſtubborn Sort break out. When Tumors of the Bone are hard, and the ſoft Parts not inflated, and are free from Redneſs, Inflammation, and Pain, as is frequently the Caſe in rickety Subjects, in this Caſe they are not attended with ſuch bad Symptoms as we have deſcribed above. SEVERINUS has given the Name of *Pædarthrocaces* to theſe Tumors, as we have already obſerved, becauſe this Caſe chiefly happens to

[a] See GORÆI, *definitiones ſub hoc vocabulo* Τερηδων [b] Pag. 52, 63, 257, et ſeq.

[c] HEYNE was of this Opinion, *Lib. citat.* p. 62. He affirms, that this Diſeaſe was not known till the Appearance of the *Lues Gallica*.

[d] This happens to the ſmall Bones, ſuch as the Bones of the Fingers, *Carpus*, or *Tarſus*.

[e] This to the larger Bones, ſuch as the *Oſſa Cranii*, *Tibiæ*, *Femoris*, *aut Brachii*.

Children,

Children, and in order also to distinguish it from the *Spina Ventosa* of the *Arabians*. But the painful, red, inflated Tumors that happen equally to Children and Adults, are called *Spina Ventosa*[a]. *Cancer vel Gangræna Ossis, aut Teredines.* By an *Exostosis* I mean a preternatural Eminence of the Bone, which is somewhat acute, or if you please, an Excrescence of the Bone, whether it is attended with Erosion or not. A *Spina Ventosa* differs from a *Caries*, by being accompanied with Tumor; and is to be distinguished from the *Rickets*, because rickety Subjects are attended with various deformed Tumors on the *Epiphyses* of the Bones, without Pain or Erosion.

V. Each of these Disorders generally begin about the Heads or *Epiphyses* of the larger Bones, where they are most tender and spongy, and where the noxious Matter may not only have sufficient room to lodge in the cellular Substance, but where it will also meet with the least Resistance in softening and expanding the Parts[b]. Nevertheless, I have sometimes seen this Disorder arise in the Middle of these Bones, between their *Lamellæ*, especially in the *Tibia*. *Tophs*, and *Venereal Gummata*, as they are called, which arise in the *Os Frontis*, and on other Parts of the *Cranium*, and frequently on other Bones, particularly on the *Tibia*, may all be ranked under this Class, as they owe their Origin to an internal Cause, and are only distinguished from the others by being particularly painful in the Night. Yet we sometimes see this Kind of Tumor in very chaste Persons, and where there is nothing venereal in the Case. Thus you see the *Spina Ventosa* is not confined to the Bones of the Extremities, but seizes even upon the Bones of the Head, Face, Neck, and Breast: Though the Bones of the Arms, Legs, Fingers, *Carpus* and *Metacarpus*, *Tarsus* and *Metatarsus*, are more frequently the Subjects of this Disorder. You may see various Cases of this Kind in MERCKLINUS's Notes on PANDOLPHINUS, *p.* 227, *et seq.* The Part affected.

VI. They arise generally, as we have declared above, from internal Causes, from acrimonious, scorbutical, rickety, or variolous Humours[c]. But principally from a venereal Taint; for they were not so frequently[d] observed in *Europe* before the Appearance of the venereal Disease. In the mean time it is reasonable to suppose, nor is it contradicted by Observations, that this Disorder may sometimes owe its Rise to[e] external Causes, especially in Persons constitutionally disposed to these Disorders: When, for Instance, the Vessels between the *Lamellæ* of the Bone, or in the *Medulla* itself, are, by a Blow, Fall, or any other external Violence, injured or torn, and the Fluids extravasated. By Degrees they putrify, corrupt and destroy the *Medulla*, and soften and corrode the Substance of the Bone: Whence proceed Pains, Tumors, Ulcers, and *Fistula* of Bones and the adjacent Parts, and all the same Mischief which is usual to arise from internal Causes. Generally from internal Causes.

[a] Vid. CELSUS *L.* viii. *C.* 10. TULPIUS *Obs. Med. L.* iv. *C.* 12.

[b] I have dissected several, who died of this Disorder; and in some I found the Bones softer than a Cartilage. [c] HILDANUS gives you Instances of this Kind, *Cent.* 4. *Obs.* 95, 96.

[d] Some are of Opinion, that this Disorder was absolutely unknown till the Appearance of the Venereal Disease; as HEYNE, *in Lib. de Morb. Oss.* p. 62. but MERCKLINUS, in his Notes on PANDOLPHINUS, *Cap.* I. has plainly evinced the contrary, and shewn that it was known to HIPPOCRATES, GALEN, CELSUS, and others, who have described it under the Names of *Sideratio, Gangræna, Cancer Ossis, &c.* which are only different Names for the same Thing.

[e] See an Instance of this in HEYNE, *De Morb. Oss. N.* 29.

Proximate Cauſes.

VII. The Proximate Cauſe of this Diſorder is either a Collection or Congeſtion of a viſcid and thick, or of an acrimonious and corroding Humour; or an Inflammation ariſing in the *Medulla*, or in the Subſtance or Cells of the Bone, degenerating into an Abſceſs, and forming *Ichor* or *Pus*. As theſe ſtagnating Fluids can find no Diſcharge from the Bones, eſpecially from their Cavities, they are confined there, till they putrify and become acrimonious, corrode and deſtroy the neighbouring Parts, converting them, particularly the *Medulla*, into a like Kind of Sanies; at length they attack the Bone, and deſtroy that. The Collection of viſcid and pituitary Fluids, with the Expanſion of the Bones, ſometimes happens without Pain, as in the *Pædarthrocaces*[a]: But the Eroſion of the Parts can never happen without the moſt acute Pains, proceeding, as we ſay, from the inmoſt Marrow. But in the Beginning of this Diſorder, when the Miſchief is only in the internal Part of the Bone, the Pain does not increaſe upon external Preſſure: When the Pain increaſes upon Preſſure, the external Parts are brought into Conſent. When this happens, the *Perioſtæum* and Parts that ſurround it, with the Subſtance of the Bone and the *Tunica cellularis* enlarge; from whence a Senſation frequently ariſes, as if the Parts were filled with Air or Wind, and the Diſorder was hence called *Ventoſa Spina*. But when the Tumor is opened, either ſpontaneouſly or by the Knife, if the Bone lays bare, you will frequently find it full of ſmall Eroſions, reſembling a Sponge or Pumice Stone, as it is in a *Caries*. From what has been here delivered, you may learn the near Reſemblance that theſe two Diſorders bear to each other, their Signs, and at the ſame Time ſome material Differences by which they are to be diſtinguiſhed.

Degrees of a *Spina Ventoſa*.

VIII. A *Spina Ventoſa*, ſtrictly ſo called, may very properly be divided into three Degrees. The firſt is, when the Patient complains of a continual grievous Pain in the Bone, which ſeems to him to proceed from the *Medulla*, and torments him ſo that he can have no Sleep. At this Time there is no external Pain or Tumor. In this State the Diſeaſe is confined to the internal Part of the Bone. The ſecond Degree of the Diſeaſe is, when after theſe Pains a red Swelling appears upon the Face of the Bone, either hard, or ſoft, and as it were windy, with external Pain more or leſs. The third Degree is, when after all the former Symptoms, an Abſceſs is formed in the Tumor, which either burſts ſpontaneouſly, or is opened with the Knife, and diſcharges a fetid *Ichor*, or purulent Matter, ſmelling like rank Butter or Lard; and afterwards maintains this Diſcharge in greater or ſmaller Quantities, like a carious Ulcer, and creates, what the Antients uſually called an Ulcer with *Caries* of the Bone. This Species of the Diſorder may be called an *Inveterate Spina Ventoſa*: The other a *recent* or *incipient* one.

Pædarthrocaces.

IX. A *Pædarthrocaces* begins with an Enlargement of the Bone, and generally without any Pain or external Cauſe: But in its Progreſs it is frequently attended with Pain and Inflammation, and at length with Abſceſs, Ulcers, *Caries*, as in the *Spina Ventoſa*, eſpecially about the Joints and Extremites of the Bones; and in ſhort is attended with the ſame Symptoms with the *Caries* and *Spina Ventoſa*. From whence it is evident, that the *Pædarthrocaces* may in ſome Meaſure

[a] MERCKLINUS thinks this cannot happen without Pain, but SEVERINUS and I have often ſeen it.

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be looked upon as a distinct Disease, in the Beginning; but if it is not presently relieved, it will at length become a perfect *Spina Ventosa*, differing from the other in nothing but Degree.

X. From considering what has been already delivered, especially what has been taught in the preceding Chapter at *Sect.* VII. concerning the *Prognosis* of a *Caries*, it will be no difficult Matter to form a *Prognosis* of what we are to expect in the Course of Disorders of this Kind. For as it is manifest, that corrupted acrimonious Matter, when it is confined in the Cavity of a Bone, or included in its *Lamellæ* or Cells, cannot be easily discharged, either by Nature or Art; it necessarily follows, that it will, by Degrees, corrupt and destroy the Parts that lay near it; till at length the Bone itself, if a timely Remedy is not applied, will be entirely corrupted and destroyed; so as to make it necessary to take off the whole Limb in order to save the Life of the Patient. Nay, what is still worse, if this Disorder arises from a vitiated State of the Blood, when you have taken off one Limb which shall have been affected in this Manner, you shall have it return with equal Fury in another, in the same Manner as it happens in cancerous Cases: Though this is not constantly the Case, especially if you correct this State of the Blood by proper Remedies, and by enjoining a strict Regularity with regard to Diet. In the *Pædarthrocaces*, and frequently in the two first Stages of the *Spina Ventosa*, the Disorder is happily cured by the Administration of proper Remedies. But the Cure will be attended with greater or less Difficulty, in Proportion to the Inveteracy of the Disorder, the Progress it has already made, the Strength of the Patient, the Degree of Corruption in the Blood, the Number and Violence of other Symptoms that accompany it; nay, sometimes it will be plainly incurable, unless you proceed to Amputation; and the Strength of the Patient being exhausted, he dies tabid. *Prognosis.*

XI. There are two Methods of treating a *Spina Ventosa*. One is suited to the two Degrees of the Disorder, which we described above, as the milder State: The other to the most violent or third Degree, when the Bones, with the Parts surrounding them, are entirely corroded and destroyed. The best Method that ever I could find for treating the slighter Degrees of this Disorder, is the following. (1.) If the Patient is an Adult, endeavour to correct the Acrimony of his Blood, by prescribing him a Decoction of the Woods, *sc. ex Rad. Sarsaparillæ, Chinæ, Scorzoneræ, Ligno Sassafras, Guaiaci, Juniperi.* Let him drink largely of this every Morning in Bed, as warm as you usually drink Tea or Coffee, giving him from eight Ounces to twelve Ounces at a Time, according to his Strength. In the first Draught let him take *Essent. Lignorum, vel Pimpinell. ad Grs.* 50. *vel* 60. or some other Drops of the same Intension, endeavouring to raise a gentle Sweat. These Medicines will penetrate into the finest Vessels, and even into the bony Fibres, and drive out the noxious Humours, or correct them, greatly promoting the Digestion and Dispersion of stagnating Fluids and Tumors. (2.) This Intension will be greatly forwarded by fumigating the affected Parts with the Steam from Decoctions of resolving or aromatic Herbs. (3.) In the intermediate Times let the Part be rubbed twice in a Day with *Unguentum Mercuriale*, covering it afterwards with the *Emplastrum Mercuriale*. (4.) At the same Time it will be proper to prescribe mercurial Remedies internally, to weak Persons but once, to robust Habits oftner, so as to raise a gentle Salivation: This must be put in Practice, or omitted, according to the Degree *Cure of the Spina Ventosa.*

Degree of the Diſorder, and the Strength of the Patient. I am fully ſatisfied by Experience, that no Good is to be done in this Caſe without the Aſſiſtance of mercurial Remedies, which makes it very ſuſpicious that this Diſorder proceeds from a venereal Taint, or has ſomething very near a-kin for its Cauſe. By diligently purſuing this Courſe for ſeveral Weeks (for it will not preſently gain ground) the firſt and even ſecond Stage of this Diſeaſe, where you have bony Tumors formed, may be cured, and the Tumors diſperſed, or at leaſt brought to that State, that they will not increaſe, but remain as they are, without bringing on any Pain, or other remarkable Inconveniency. This I have frequently ſeen, where I could by no Means diſperſe them. Eſpecially where the Patient is regular and moderate in his Diet, living upon ſoft Broths inſtead of ſolid Meats, and drinking the ſmall Runnings of the aforementioned Decoction for his common Drink; or, inſtead of that, the *Decoction Cornu Cervi*, *Hordei*, *Avenæ*, or any other thin aqueous Liquors.

Cure of the *Pædarthrocaces.*

XII. The ſame Method muſt be uſed in treating the *Pædarthrocaces*, whether attended with Pain or not; giving frequently, at proper Intervals, gently opening Medicines with ſmall Quantities of *Mercurius Dulcis*. If this Diſorder is accompanied with the Rickets, you muſt adminiſter Medicines adapted to this Complaint, and adviſe frequent Exerciſe.

Cure of a bad *Spina Ventoſa.*

XIII. If either of theſe Diſorders ſhould be ſo far advanced, as to be out of the reach of the Remedies we have already adviſed; if the Pain and bony Tumors increaſe, Abſceſſes are forming, and you have great Reaſon to fear the entire Deſtruction of the Bone; if the Abſceſs does not burſt of itſelf, you muſt not ſtay for its Maturation, but lay the Bone bare with your Knife in the moſt proper Place, which is generally the moſt painful, and deſcending Part, or where it is already burſt. If the Opening is too narrow, you muſt enlarge it; if your Patient dreads the Knife, make your Opening with a Cauſtic, and afterwards make ſeveral [a] ſmall *Foramina* in the Bone with the ſmall Piercer, *Plate* VII. *Fig.* 2. or *Fig.* 7. A. or *Plate* XIV. *Fig.* 8. You muſt pierce down to the Meduſla, that there may be room for a Diſcharge of the confined Matter. But where theſe *Foramina* are not ſufficient for the Diſcharge, you muſt apply a larger Piercer, which they call the Trepan [b], if the Bone will admit of it with Safety; which will not only make greater room for the Diſcharge of the corrupted Matter, but you will alſo be able to apply your Medicines more conveniently to the Part. Whilſt you are proceeding in this manner, you muſt inſiſt upon the internal Uſe of the Eſſence and Decoction of the Woods, with antimonial and mild mercurial Medicines: Externally you muſt treat the Ulcer with cleanſing and balſamic Applications, ſuch as *Decoctum Agrimon. Saniculæ*, *Hyperici vel Ariſtolochiæ*, *cum Melle Roſar. & Eſſent. Myrrhæ at Aloes*, which ſhould be injected with a Syringe twice every Day; or a Solution of *Mercurius Dulcis in Aquâ Plantag. vel. Aquâ Calcis.* Afterwards you may dreſs with the Eſſences we have juſt mentioned, or *cum Eſſent. Maſtichis aut Succini*, ſpread upon Lint, covering all with a mercurial Plaſter, or with any other that you ſhall think more convenient. This Method is to be continued till the Parts

[a] This has been adviſed by CELSUS, PAREUS, SEVERINUS, SENNERTUS, MARCHETTUS. See MERCKLINI *Not.* p. 483, ſeq. [b] CELSUS has recommended this Method, *Lib.* viii. *Cap.* 2 & 3, and HEYNE, *Lib. de Oſſ. Morb.* p. 68. and PETIT, *Lib. de Morb, Oſſ. Cap. de Exoſtoſi:* And BOERHAAVE, *in Aphoriſm. practic.*

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heal. Sometimes the actual Cautery may be uſed to Advantage in this Caſe, to root out the Diſorder, eſpecially when it is only between the [a] *Lamellæ* of the Bone. Raſping or Scraping ſeems to me to be much better ſuited to the *Caries* of the Bone, than to the *Spina Ventoſa*.

XIV. But when Things are ſtill worſe, and all the Remedies we have hitherto recommended are of no Effect; when the Part is already too much corroded and deſtroyed, ſo that there are no Hopes left of ſaving it, or indeed of ſaving the Patient, but by amputating the diſeaſed Part; you muſt determine on the Operation, which is to be conſidered in two Lights, according to the Difference of the Parts affected. 1. When the Diſorder is ſituated on the ſmall Bones, as on the *Carpus*, *Tarſus*, *Metacarpus*, or *Metatarſus*, or even on the Finger; it will not always be neceſſary to take off the whole Member, that is to ſay, the Finger, Foot, or Hand: But it will frequently ſuffice to remove the corrupted Bone alone. For Inſtance, when the laſt or middle Bone of one of the Fingers has been diſeaſed, I have taken out the foul Bone, and left the ſound Part of the Finger remaining. When the Metatarſal Bone, that ſupports the great Toe, has been diſeaſed [b], I have removed the corrupted Parts from the ſound, and ſaved the Toe. This I did in a Boy of ten Years of Age, and he recovered ſo well, that he walked afterwards as well as before [c]. Where the whole Finger, or only the firſt Bone, has been foul, I have taken off whole Fingers and Thumbs. Cure of the laſt Stage.

XV. In larger Bones, when the whole Bone is not affected, but only a Portion of its external Surface is diſordered with a *Caries* or *Spina Ventoſa*, you muſt by no Means take off the whole Limb, but remove that Part of the Bone only which is affected, in the ſame manner as we taught in the foregoing Chapter on the *Caries*, *Sect.* XVI. But when a large Bone, as the *Os Humeri*, *Tibia*, or *Femur*, or entire Joint of the Arm, Knee, or Foot, is diſeaſed, there is no Remedy but Amputation; making your Wound in the ſound Parts above all that is diſeaſed: But we ſhall treat more fully of this Subject when we write on Chirurgical Operations. When part only of a large Bone is foul. When the whole Bone or Joint is diſeaſed.

XVI. In certain Species of the *Spina Ventoſa*, where the Tumor of the Bone will not yield to the Application which we have adviſed above, and you can come at it with your Hands, PETIT [d] adviſes you to lay the Bone bare by a cruciform Inciſion, and to cut off the extreme Parts of the four Angles of the Skin: And when this is done, to dreſs with dry Lint. On the Day following you are to bore ſeveral Holes in the Tumor, ſo near each other, that it may be pierced like a Sieve: You are then to take the whole off with a Chiſſel and Mallet. The Wound is to be filled with dry Lint: And that the diſeaſed Parts may ſeparate the ſooner from the ſound, he orders the foul Part of the Bone to be dreſſed with a Solution of Mercury in *Aqua Fortis*. This Method is to be continued till you have obtained an Exfoliation. He is very high in the Commendation of this Proceſs, and I think deſervedly prefers it to any other Re- Where the Tumor of the Bone will not give way.

[a] SEVERINUS appears to be too fond of the actual Cautery in theſe Caſes, *Cap.* 20. for frequently we cannot get to the Bottom with it, or the Parts are too much corrupted to expect Advantage from it. [b] LE DRAN, in *Obſ.* 112. recites nearly the ſame Caſe, where he took off the *Metatarſus*, Toe, and all; but this ſhould conſtantly be avoided where it is poſſible, for the Toe is of great Advantage in walking.

[c] See in SCULTET. *Obſ.* 90. the Caſe of a Thumb and Hand taken off for a *Spina Ventoſa*.

[d] *Lib. de Morb. Oſſ.* Cap. *de Caris*.

medy

medy in these Cases, even to the actual Cautery, where the Caries has not penetrated too deep.

How to remove an *Exostosis.*

XVII. When an acute Eminence or Excrescence, which is properly called an *Exostosis*, pushes preternaturally above the Bone, creating no Disturbance, Pain, or Deformity, and unaccompanied with *Caries* or *Spina Ventosa*, as I have frequently seen them; in my Judgment it is best to let it alone: For the Remedy will be worse than the Disease, and, by laying the Bone bare, you may bring on a *Caries* or other Inconveniencies. On the other hand, if it occasions any Deformity, impedes any Action, or produces Pain or other Mischiefs, you may take it off in the manner we have just taught above. You may see various Cases of *Caries*, *Spina Ventosa*, and *Exostosis*, in the Figures of that splendid Work, Cheselden's *Osteography*, from *Plate* XLI. to the End: In Ruysch, *Obs.* p. 94. in his *Thesaur. Anatom.* VIII. *Tab.* 3. and *Thesaur.* X. *Tab.* II. and Bidloo's *Oper. Anatom. Chirurg.* p. 208. *Tab.* II.

CHAP. X.

Of Ulcers *of the* Head.

What these Disorders are.

I. IT remains with me now to say something of Ulcers of the Head, and particularly of those which occupy its hairy Part, and are at this Time called either *Tinea*, *Favus*, or *Achores:* But the Professors of Medicine do not at all agree about the Signification of these Terms. By the Term *Favus*, we commonly understand Ulcers of the Head, that are full of Cavities like a Honey Comb. By *Achores*, those Ulcers which are full of small *Foramina*, which contain a moderately viscid Humour. Many call these Disorders *Tinea*, because, from the Abundance of small *Foramina* in them, they resemble moth-eaten Garments. But for the most Part, the Term *Tinea* at present is applied to a large dry Scab, which Children and Infants are subject to upon the Head, full of thick foul Scales, and very offensive to the Smell: This sometimes extends itself to the Face, in which Case we call it *Crusta Lactea*. This is often benign and of a mild Nature, but sometimes ill-conditioned and dangerous. There is still a worse Kind of *Tinea*, or scabby Head, covering the whole hairy Scalp with an ash-coloured thick Crust, attended with a violent Itching, and stinks grievously: This is generally very difficult of Cure. Persons afflicted with this Complaint, have a very pale unhealthy Countenance. These Disorders are much more frequently met with in Infants and Children than in Adults. They are occasioned either by the Nurse's irregular Course of Life, or by the Child's being used to foul Feeding, from whence foul Blood is made, which produces Ulcers of this Kind. Sometimes they break out in an adult State, resembling a Kind of Leprosy, which is very difficult to cure. In the *Pox* you frequently find both Head and Face, particularly the Forehead, spread with dry Scabs, and scabby Ulcers, which is called a *Venereal Scabies*. Venereal *Gummata* also and *Tophs* of the Head, may be referred to this Class, since they frequently degenerate into Ulcers.

II. Though

II. Though the Ulcers which we have just described, differ from each other in some Particulars, yet I shall not speak separately of them in this Place, as they are to be cured pretty nearly in the same Manner. When they are slight, it will be proper to give a gentle Purge now and then, with the Addition of a small Quantity of *Mercurius Dulcis*; administring between whiles to an adult Patient, Decoctions of the Woods, with edulcorating Pills, Powders, or Essences. Infants at the Breast may take diaphoretic Powders: But their Nurses may prosecute this Intention with Powders, Pills, Decoctions, or Essences. Externally, you may anoint the Scabs with *Chemon Lactis cum pauca Cerussa præparata mistus*; or with *Oleum Ovorum* alone, or with the Addition of a small Quantity of *Oleum Ceræ*; or with *Unguentum de Enula*, *de Cerussa*, *Diapompholygos*, or with any other of the same Intention: Observing at the same Time Regularity in Diet, and defending the Body from the Injuries of the external Air. By this Method, not only Ulcers of the milder Kind are healed, but even those of the more malignant Sort; especially if you give small Quantities of *Mercurius Dulcis* at the same Time, or mix *Mercurius Vivus* with your Ointments. But these Medicines are to be used with Caution. Cure.

III. In worse Degrees of this Disorder, especially where you cannot be perfuaded to use Mercurials, you will never succeed in your Cure, till you have taken off all the Hair, with which these Ulcers have a strong Connection. In some Places it is the common Practice to pull out the Hair by the Roots, either by Degrees, or at once, with a *Pitch Plaster* [a], which is spread upon a strong Cloth, or upon Leather, and applied all over the Head, after the Hair has been cut off as far as the Scabs. When it has taken fast hold, they let it lie on for twelve or twenty-four Hours, and then they tear it off at once, and it brings away with it both the scabby Crust and the Roots of the Hair: But this cannot be done without great Pain and Effusion of Blood. When the Plaster is torn off, they wipe away the Blood with dry Lint, and anoint the Head with some *Oleum Laterinum*, with the Addition of a little *Oleum Ceræ* warmed, and cover it with the *Emplastrum de Spermate Ranarum pauca Camphora impregnatum*; dressing in this Manner every Day, till the injured Parts are clean, and then they heal with *Oleum Ovorum vel Essentia Succini* [b]. They prescribe internal Medicines to correct the Blood, such as you saw in *Sect.* II. and advise Regularity in Diet. Antimony either alone, or mixt with a small Quantity of *Flores Sulphuris*, is very serviceable in this Case. You should diligently avoid beginning with the Use of Mercurial or Sulphureous Ointments; because they are very apt to repel the noxious Humours, and endanger the Life of the Patient: Which Effect they are not observed to have, after you have administred Cleansers of the Blood for some Time internally. Another Method.

IV. In scabby Ulcers of the Face, which happen in the Infant State, and are vulgarly called *Crusta Lactea* or *Achores*, the same evacuating and corrective Medicines are to be prescribed for the Nurses, which we ordered above *Sect.* II. The Infants themselves also should be purged frequently, and in the Intervals Cure of the *Crusta Lactea*.

[a] JUNKER in his *Surgery*, p. 280. recommends a Plaster of Pitch, Scammony, and Resin.

[b] WEDEL tells us, that the *Tinea* may be cured, and Vermin in the Head at the same time destroyed, by washing the Head over with liquid Pitch; applying previously internal Medicines. *Lib. de Morb. Infant.* p. 61.

between purging, ſhould take diaphoretic Powders prepared *ex Antimonio Diaphoretico, Lapid. Cancrorum, Antimonio crudo, & Flor. Sulphuris.* When they have taken theſe Medicines for ſome Time, you may daub the ſcabby Parts with a Liniment made *ex Cremore Lactis cum Cretâ vel Ceruſſâ*; or in the room of this you may uſe *Oleum Ovorum cum pauco Olei Laterini.* Ointments prepared of Mercury or Sulphur are very dangerous in the Beginning of this Diſorder, or to very weakly Infants. But if Remedies of this Kind ſhould be uſed by unſkilful Perſons, which is frequently the Caſe, to the Detriment of the Patient, you muſt endeavour to ſtrike the Humours out again by preſcribing Sudorifics in different Forms, both to the Infant and its Nurſe, till you have ſatisfied this Intention.

End of the FIRST PART.

INSTITUTIONS OF SURGERY.

THE PREFACE.

HAVING finiſhed the firſt Part of our Inſtitutions of Surgery, which treats profeſſedly of the Five Kinds of Diſorders of the Human Body, which require the Aſſiſtance of the Surgeon; to wit, Wounds, Fractures, Luxations, Tumors, *and* Ulcers; *we ſhall proceed now to the Second Part, which is dedicated to* Chirurgical Operations. *And in this Volume we ſhall take an Opportunity to treat of ſuch Diſorders as remain undeſcribed, either as not properly belonging to any of the foregoing Heads, or ſuch as require particular Contrivances and Machines to be made Uſe of in their Cure. In doing this we ſhall conſult Order as far as the Nature of the Subject will admit of it. We ſhall firſt deſcribe thoſe Operations, which may be performed in almoſt all, or at leaſt in various Parts of the Body; as opening a Vein, making Iſſues, applying the actual Cautery, taking off Excreſcences or intire Parts of the Body. We ſhall then proceed to thoſe which have their proper Situations, and happen each to one particular Part of the Body. In performing this Part of our Work, we ſhall begin with thoſe which belong to the Head and each of its Parts, as the Cranium, Eye-lids, Eyes, Ears, Noſe, Lips, Teeth, Gums, Tongue, Palate, Tonſils, Uvula, &c. Then we ſhall deſcribe thoſe Ope-*

rations, which are accommodated to Diſorders of the Neck: From thence we ſhall proceed to the Breaſt, ſo on to the Abdomen, and its neighbouring Parts, to wit, the Anus and Pudenda of both Sexes. Laſtly, we ſhall deſcribe thoſe Operations which are performed on the upper and lower Extremities. Notwithſtanding the great Number of theſe Operations, and the various Methods of performing them, will render this Taſk extremely difficult, yet it ſhall be our principal Care to explain the Nature of each particular Operation, the beſt Method of performing it, and the fitteſt Inſtruments to be made uſe of for that Purpoſe, with all the Clearneſs that the Subject will admit of. By purſuing this Method, we ſhall not only teach the young Beginner the firſt and ſolid Principles of Surgery; but the Surgeon alſo who has already had ſome Experience in his Profeſſion, will, I hope, find ſomething in theſe Inſtitutions, by which he may, in ſome Meaſure at leaſt, perfect and adorn his Art.

INSTI-

INSTITUTIONS OF SURGERY.

PART II.

Of OPERATIONS.

SECT. I.

Of GENERAL OPERATIONS *practicable in ſeveral different Parts of the Body.*

CHAP. I.

Of PHLEBOTOMY *in general.*

I. WE begin with the Operation of *Phlebotomy:* Becauſe it is of all the moſt general, performed in moſt Parts of the Body, and by much the moſt frequent in Uſe at this preſent Day. By Phlebotomy or Bleeding we here intend the opening a Vein, by a ſharp-edged and pointed Inſtrument of Steel, for extracting a proper Quantity of Blood, either for the Preſervation or Recovery of a Perſon's Health. Phlebotomy what.

II. Veneſection appears to be not only one of the moſt uſeful, but moſt antient Operations in Surgery: Since we find, by the Writings of HIPPOCRATES, CELSUS, and others, that it was even celebrated near three thouſand Years ago. Yet there have not been wanting ſome among the Antients, and Moderns, who have reviled this Practice, as both cruel and fatal to the Healths and Lives of Mankind, as ERASISTRATUS, PARACELSUS, HELMONT, PORTIUS, BONTEKOE, GEHEMA, *&c.* But I think all their Objections too weakly founded to need any Refutation; which might very well be made even only from the daily Experience we have of the great Uſefulneſs of this Operation, in alleviating, preventing, and curing moſt Diſorders of the human Body, eſpecially A moſt antient and uſeful Operation.

thoſe

those of the acute and inflammatory Kind. The Operation is said to have been first hinted to us by the *Hippopotamus*, who, at stated Seasons, used to open a Vein with a sharp-pointed Reed, according to POLYDORE VIRGIL, *De Rer. Inventor.* p. m. 65.

Phlebotomy often difficult.

III. Nor is the Operation in many Cases practicable with so much Ease and Safety as is commonly imagined. For though in some Patients the Veins lie so open and conspicuous, that even a Novice will find no Difficulty in making their Apertion; yet in others they are either so small or deeply situated, that the most expert Surgeon is sometimes at a Loss, and may, by Accident, miscarry. Add to this, that as the Arteries, Nerves, and Tendons, are frequently very nearly seated to the Veins, it is no uneasy Matter to injure one or other of them with the Instrument used in Bleeding: Which is quickly followed either with a profuse or fatal Hæmorrhage, an Aneurism, violent Pains, Inflammation, Fever, Mortification, or even Death. Phlebotomy therefore should be performed with no less Judgment and Caution, than the other important Operations in Surgery: Especially as the Reputation of a young Surgeon may suffer as much by Neglect or Accidents in this Way, as in many of the other less usual and seemingly more difficult Operations.

Qualifications of the Phlebotomist.

IV. A good Phlebotomist should have a steddy, nimble, and active Hand, with a sharp Eye, and undaunted Mind; without which he may either be liable to miss the Vein, or commit some Accident that may be injurious or fatal to the Patient and his own Character. For these Reasons it is that Venesection is less readily practised by the Surgeon as he advances in Years: Because old Age is generally accompanied with a weak Eye and a trembling Hand.

Instrument for Bleeding.

V. The Instrument which is in common Use amongst the Surgeons for opening a Vein is called a *Lancet*. The Shape of this Instrument is described at *Plate* I. A. and at *Plate* XI. *Fig.* 5. The Surgeon should take Care to be always provided with a sufficient Number of these, and to have them constantly in order, and to have some also of a larger Size. Thus he will be prepared for Veins in different Subjects. And as this is an Operation that frequently requires to be performed on a sudden, he will never be at a Loss. There are many Surgeons in *Germany*, particularly in *Franconia*, *Bavaria*, and *Lower Saxony*, who bleed with a *Fleam*, *Plate* XI. *Fig.* 3. which they use in this Manner. They hold one of their Fingers upon the Part B, and applying the Point A to the Vein, they strike the Part C with one of the Fingers of the other Hand, opening the Vein as Farriers do in Horses. Some of the Surgeons and Bagnio-Men use a neater Instrument, an *Elastic* or *Spring Fleam*, which the *Germans* call *Schnapper*, or *Schnapperlein*, *Fig.* 4. When they have drawn it up, they apply the Point A to the Vein, and then let it go by pressing upon B. Some again use a Lancet in the Form of a Dart, the Figure of which you may see in CRONE *de Venesectione*, p. 33. *Fig.* 4. But since the Position and Size of the Veins is different in different Subjects, we find that the most convenient Instrument for our Purpose is the *French* Lancet: Though many of our Surgeons are very expert in the Use of the *German* Lancet, *Fig.* 3 and 4.

In what Part the Operation is to take place.

VI. Though the Operation of Bleeding is frequently performed in different Parts of the Body, as in the Hand, Foot, Forehead, Temples, Neck, Tongue, Penis, and other Parts; yet it is most generally performed in that Vein of the Arm which lies near the Joint of the *Cubit*. Therefore we shall begin with teaching

teaching the Method of opening this Vein, and treat more fully of it than of any other.

CHAP. II.

Of OPENING *the* VEINS *of the* ARM.

Preparation for Bleeding.

I. IT is commonly enough known, that the Operation of Bleeding in the Arm is performed on the Veins that lie on the internal Part of the *Cubit*. There are ſeveral Things worthy the Surgeon's Notice in this Operation: Some of which regard the Things that are to be done preparatory to Bleeding; ſome in the Operation itſelf; others immediately after the Performance of it. Of each of which we ſhall ſpeak diſtinctly in their Order. Preparatory to Bleeding you ſhould have in readineſs, (1.) *a Linen Fillet*, about a *Paris* Ell in Length, and two Fingers in Breadth, with or without ſmall Strings faſtened at each End of it. (2.) Two *ſmall ſquare Bolſters*. (3.) *Porringers* or Veſſels to receive the Blood. (4.) *A Sponge* with warm Water. (5.) Some *Vinegar*, *Wine*, or *Hungary Water*, to raiſe the Patient's Spirits if he ſhould be inclinable to faint. (6.) *Two Aſſiſtants*, who muſt be void of Fear, one to hold the Porringer, the other to reach you any thing that you ſhall want. (7.) *A ſmall Wax Candle*, when the Patient is to be blooded at Night, or in a dark Place. (8.) You muſt place your Patient upon a *Couch*; or, if he is very fearful of the Operation, lay him up on a Bed, leſt he ſhould fall into a Swoon. (9.) Laſtly, you ſhould take Care that no Hair or the Cloaths of the Patient lie in your Way. The Patient himſelf ſhould take Care that nothing ſhould give him any Concern: And he ſhould avoid terrifying himſelf with recollecting the Miſchiefs which have happened by the unſkilful Performance of this Operation. Laſtly, the Operator ſhould be as expert in bleeding with his left Hand as with his right. For, as you are readier at bleeding in the right Arm with your right Hand ſo when you are to open the Veins of the left Arm, you will find it neceſſary to uſe your left Hand: And there are ſome Patients who inſiſt upon being blooded in the left Arm.

What is to be done in the Operation.

II. Though the Operation is to be performed at once, with one Puncture, yet many things are to be obſerved in order to render it ſucceſsful. Firſt, it is neceſſary for the Surgeon to inſpect his Patient's Arm diligently, that he may ſee the Courſe of the Veins: He muſt then take hold of the Arm, and extend it towards his Breaſt, tucking up the Sleeve about a Hand's breadth above the Bend of the *Cubit*, where he muſt make his Ligature, rolling the Fillet twice round, and faſtening it with a Knot (*Plate* XI. *Fig.* I. D.) The Veins being compreſſed, and the Blood being ſtopped in its return, they will enlarge, and lie fairer to the Eye. The Ligature generally uſed upon theſe Occaſions is a Slip of fine Scarlet Cloth, but any other Colour will anſwer the Purpoſe as well. When you have bound up the Arm in this Manner, you let it go for a ſmall Time till you have taken a Lancet out of your Caſe: And opening it ſo that it may make a Sort of an obtuſe Angle, you take hold of it with your Teeth about the Joint (A. *Plate* XI. *Fig.* 5.) and hold it ſome time till the Veins grow turgid. You are then to lay hold of the Arm again in the ſame Manner

as

as we directed before, and extend it to your Breaſt, having an Aſſiſtant ready with the Veſſel in his Hand, at a convenient Diſtance for receiving the Blood.

What Vein is uſually opened.

III. You are now to examine which Vein lies faireſt, and is therefore moſt proper to be opened. For you muſt obſerve that in the Arm there uſually appear three principal Veins: The firſt is called *Vena Cephalica*, and is found in the external Part of the Arm. *See Plate* XI. *Fig.* 1. A. The Second is termed *Baſilica*, and lies on the internal Part of the Arm: In the right Arm it is alſo called *Hepatica*; in the left, *Splenetica*, *See ibid. Letter* B. The Third, which is obliquely ſituated between the former two, is called *Mediana*. *See Letter* C. The median and baſilic Veins, as they are larger than the cephalic, diſcharge a greater Quantity of Blood, but are attended with more Danger in the Operation: For a conſiderable Artery and the brachial Nerve lie under the baſilic Vein, and the Tendon of the Biceps Muſcle under the Median. But as they lie fairer to the Eye, and are therefore more frequently the Subjects of the Operation we are treating of, than the cephalic Vein, it is ſafer and more eligible for the leſs experienced Surgeons to open the baſilic, or at leaſt the Median Vein. But ſometimes the Veins are ſo ſituated in the Arm, that only one of them will lie expoſed to View, which deprives you of all Choice. Your only Safety in this Caſe depends upon your Choice of a ſkilful and cautious Surgeon.

In what Part the Vein is to be opened.

IV. When you have determined which Vein to open, you are to perform the Operation on that Part which preſents itſelf faireſt to you. But if the Vein has frequently been opened, and the Part which appears largeſt and faireſt is full of Cicatrices, you are not to open above, but below the Cicatrices, by which Means the Blood will diſcharge itſelf more freely: For the Part above is generally ſtraitened by the Cicatrix. For this Reaſon, whenever you open a Vein for the firſt Time, begin as high as you can, by which Means you will have the more room to deſcend in repeated Bleedings.

What is to be done immediately before Bleeding.

V. Before you apply the Lancet to the Skin, when the Veins are not riſen it will be proper to rub the Arm below the Bandage, which will drive the Blood back towards the Cubit, and render the Veins more turgid. Whilſt this is doing in the right Arm, the Surgeon ſhould take hold of the Patient's Arm in ſuch a Manner that he may lay his Thumb upon the Vein which he intends to open, to prevent the Blood from flowing back, and to keep the Vein from rolling. You are now to fix your Eye upon that Part of the Vein which you intend to open, and taking the Lancet out of your Mouth with your right Hand, ſo placed that the Thumb and firſt Finger may be fixed about the Middle of the Blade: The other Fingers ſhould reſt gently upon the Patient's Arm, to prevent your Hand from ſlipping.

How the Puncture is to be made.

VI. Your Lancet is now to be puſhed lightly and carefully forward by your Thumb and fore-finger, till it has penetrated through the Coats of the Vein; and at that Inſtant to be raiſed a little upwards in order to enlarge the Orifice of the Wound, which will give a freer Paſſage to the Blood. The moſt common and convenient Size of an Orifice is about twice the Breadth of the Back of an Ordinary Knife. You are to keep even between the two Extremes of Raſhneſs and Timidity in making the Puncture. For as in one Caſe you will only divide the common Integuments, and ſo leave your Work undone: So in the other you will run the Riſque of wounding the Artery, Nerve, or Tendon.

The Vein may be opened in three Directions. Some open it in a ſtrait Line, *Plate* XI. *Fig.* 2. *Letter* A. Others tranſverſely *B:* But moſt Surgeons make an oblique Wound *C D.* If the Vein is to be opened in the left Arm, the Surgeon muſt change Hands, and do all with his left Hand, which we have directed above to be done with the Right. If you are to bleed with the *German Fleam*, place the Point *A* upon the Vein; and taking hold of the Extremity *B* with your left Hand, drive the Point of the Fleam into the Vein by a Stroke with one of the Fingers of your Right Hand. But if you will phlebotomiſe with the Spring-Fleam, *Fig.* 4. you cock it, by elevating the Hook *c*; and placing the Point *A* upon the Vein, by letting looſe the Spring, it is by a gentle Preſſure plunged into the Veſſel.

VII. Your Aperture being thus made, and the Inſtrument drawn inſtantly back, the Blood will then ruſh forth from the Orifice either in a large or ſmall Stream: Hereupon your Inſtrument muſt be depoſited in the Baſon or Diſh, and not thrown upon the Bed, leſt it ſhould be loſt, or elſe injure the Patient. In the mean time the Blood muſt be permitted to flow as long as it ſhall be judged uſeful or neceſſary: And if it ſhould ſtop too ſoon, as it often may from too great a Stricture of the Bandage on the Arm, it muſt be ſlackened a little, by which means the compreſſed Artery being ſet at Liberty, the Blood will flow from the Orifice as at firſt If you find the Orifice obſtructed by too great a Tenſion of the Skin, or an Intruſion of the *Membrana Adipoſa*, you ought in that Caſe to return the bit of Fat, by preſſing with the Finger or a warm Sponge, and to relax the Skin by bending the Arm a little. Laſtly, if the Orifice be obſtructed by thick, grumous, or congealed Blood, that Impediment may be removed by wiping it with a Sponge dipt in warm Water. Treatment after Aperation.

VIII. But that the Patient's Arm may not become painful or languid, by holding it long extended, the Surgeon ſhould ſupport it by the *Cubitus* for a little while; and then give him a Stick, or other cylindric Body, to turn round in his Hand, that by the Contractions of the Flexor and extenſor Muſcles of the Fingers, the Courſe of the Blood may be accelerated towards the *Cubitus:* Which will be ſtill further promoted, if the Patient urges a little voluntary Cough. In the mean time his Attendants ſhould ſtand ready with other empty Cups or Veſſels for receiving the Blood, to carry off ſuch as are full, and adminiſter the Dreſſings for the Deligation, with cordial Water, and other ſuch Neceſſaries. Method of cloſing and binding up the Orifices.

IX. The Quantity of Blood neceſſary to be taken from the Vein at one Bleeding, muſt be determined by the Phyſician, from conſidering the Patient's Diſorder, Strength, Habit, and other Circumſtances. But when the Surgeon attends his Patient without a Phyſician, he may then ſafely proportion this Evacuation himſelf at his own Diſcretion, by reflecting on the Nature of the Patient's Caſe, his Age, Strength, Courſe of Life, and fulneſs of Habit, *&c.* for he may permit the Patient, that ſhews no Paleneſs of Countenance, nor Diminution of Strength or Spirits, to bleed longer than thoſe that quickly grow faint, *&c.* What muſt be done by the Patient and his Attendants.

X. When there ſeems to be a ſufficient Quantity of Blood diſcharged, the Ligature muſt then be immediately taken off from above the Elbow, and the Skin about the Orifice muſt next be gently ſtroaked or preſſed together by the two fore-fingers of the left-hand: By which means the Lips of the divided The Quantity of Blood to be taken.

Vein are more eaſily compreſſed and cloſed. But while the Surgeon is doing this with his Left Hand, he takes the ſmalleſt of the two Compreſſes brought to him by the Servant, and applies it upon the Inciſion with his Right-hand: But ſo as to let what little Blood may remain betwixt the Orifice and the Vein, be diſcharged, before he impoſes the Compreſs. Over the firſt or ſmall Compreſs he ſhould impoſe another that is a little larger, preſſing them both gently on the Orifice with his left Thumb, till the Bandage is laid acroſs. But before the Deligation is performed, according to the Directions we ſhall give for that Purpoſe in the laſt Part of our Surgery, on Bandages, it will be a Piece of Neatneſs and Decency in the Operator, to wipe off what Blood may have adhered to the Arm with a wet Sponge or Napkin, and then to go on with his Bandage. There are indeed many Surgeons who apply but one Compreſs, which they firſt wet in Water, Vinegar, Wine, or its Spirit: Though, in my Opinion, two Compreſſes make the Deligation more firm and ſecure: Though I think it is no great Matter whether they are applied wet or dry; the dry will ſit eaſieſt on the Part.

Treatment after Deligation.

XI. Having applied your Bandage, and drawn down the Patient's Sleeve over his Arm: He ſhould be ordered not to uſe it too early or violently, before the Orifice is well cloſed, which might excite a freſh Hæmorrhage, an Inflammation, Suppuration, or other bad Accident. And if the Patient ſhould faint away ſoon after the Operation, it may be then convenient to wet his Noſtrils with *Hungary* Water or Vinegar, and to ſprinkle ſome of the laſt, or elſe cold Water, in his Face: And eſpecially in Summer-time to let in the freſh and cool Air, by opening the Windows, *&c.* Alſo, if any Wine or cordial Water be at hand, you may give the languiſhing Patient a ſmall Draught thereof; and then the Surgeon will have nothing more to do than waſh his Hands, and the Inſtrument, before he puts it up in his Caſe.

Judgment paſſed on the Blood.

XII. In the next Place, it is often cuſtomary to aſk the Opinion of the Surgeon or Phyſician preſent, concerning the healthy or morbid State of the Blood, from its external Appearance. In this Caſe the Surgeon ſhould always make a good Preſage to his Patient and By-ſtanders, even though the Blood ſhould appear bad: For it is not eaſy to expreſs the good Effects that may follow from chearing up the Patient's Mind, which is much better than to leave a heavy Impreſſion on it by a ſevere Prognoſtic. Therefore, if the Blood appear florid, the Surgeon ſhould declare it a Sign that the Patient either is, or ſpeedily will be in good Health. If the Blood appears vitiated, or of a bad Colour, he muſt then pronounce the Bleeding will be extremely ſerviceable to him. If the Patient ſhould, in the mean time, be in a Swoon, the Surgeon ſhould take Occaſion even from thence to ſignify the great and ſpeedy Effect the Diſcharge will have towards the Recovery of the Patient's Health. When ſuch or the like encouraging Diſcourſe has been paſſed, the Blood ſhould be ſet by in a cool Place, till the Phyſician or Surgeon renews his Viſit.

Whether the Patient may ſafely drink or ſleep after Bleeding.

XIII. If the Patient ſhould be thirſty after Bleeding, you ought not to deny him the Pleaſure of drinking, eſpecially thin Liquors. The *French* make it a Cuſtom to give the Patient a large Draught of Cold Water after Phlebotomy in inflammatory Diſorders: In which Caſes, if the Patient be of a warm Habit, that Practice may be extremely beneficial. But in cold and weak Habits, it ought not to be encouraged: For them it will be better to give ſome warm

Sup-

Suppings of Tea, Coffee, or the like. If any body ſhould propoſe the Queſtion, Whether the Patient may ſleep ſafely after his Bleeding, your Anſwer may be either in the Affirmative or Negative, according to particular Circumſtances. If the Evacuation was made by way of Prevention, or to preſerve the Body in its healthy State, it will be more adviſeable for the Patient to ſhake off his ſleepy Diſpoſition by walking, or engaging in ſome agreeable Sport or Exerciſe: Becauſe if Sleep be indulged, the Bandage may get looſe, or ſlip up above the Orifice, and ſometimes thereby occaſion a profuſe and dangerous Hæmorrhage. This Objection ought not, however, to deprive the Patient of a comfortable Repoſe, in caſe of great Weakneſs and Indiſpoſition; eſpecially if he has had no Sleep for a long time before: Then it would be denying him a Benefit perhaps greater than the Remedy of Bleeding itſelf. But for the greater Security, it may not be amiſs to let the Nurſe, or ſome body, have a watchful Eye over the Patient during his Repoſe; that in caſe of ſuch an Accident, timely Relief may be had by compreſſing the Vein with one's Finger till the Surgeon can be called.

Behaviour in your After-viſits.

XIV. When the Surgeon or Phyſician comes again to viſit the Patient, the Blood is uſually ſet out again to have a freſh Judgment paſſed upon it: In which Caſe the Verdict given ought to be ſuch as will exhilarate the Patient, and not depreſs his Spirits, agreeable to what we ſaid before on this Head at *Sect.* XII. The Surgeon muſt in the next Place inſpect the Deligation, to ſee if the Bandage be too looſe: And in taking it off, if the Compreſs adheres to the Lips of the Orifice, he ought not to force it away, but to apply his Bandage over it again as before. After waiting a Day or two longer, it will ſpontaneoſly ſeparate, or fall off from the cloſed Orifice, which will by that time be near cicatrized. There are ſome, who being prejudiced in Favour of the enthuſiaſtic Doctrine of Sympathy, will have their Blood run into cold Water, or have cold Water poured upon it, in febrile Complaints, thinking by that means to allay the Heat of the Blood. In this Reſpect it may be of ſervice to humour and ſatisfy their Minds, though there may be nothing in the thing itſelf.

CHAP. III.

Of PHLEBOTOMY *in the* HAND.

What Veins are opened in the Hands.

I. THERE are two principle Veins in the Hands, which with us in *Germany* are ſometimes opened to bleed the Patient. The one is called *Salvatalla*, and runs on the Outerſide of the Back of the Hand towards the Little Finger, being ſometimes denominated *Splenica* by the Antients, who judged its Apertion extremely uſeful in Melancholy, and Diſorders of the Spleen. The other Vein, which is termed *Cephalica*, runs betwixt the Thumb and Forefinger, and was formerly ſo denominated from an Imagination, that bleeding from it was more particularly uſeful than from others in Diſorders of the Head. But we are at preſent convinced thoſe Notions of the Antients were without Foundation; and though the Patient is bled more difficulty and ſlowly by theſe Veins, yet the Effects will be the ſame as after Phlebotomy in the Arm. Yet

it may be ſometimes convenient for the Surgeon to open them either at the particular Requeſt of the Patient; or when the Veins of the Arm are very deeply or obſcurely ſituated, and theſe lie fair and conſpicuous for Inciſion. To which we may add, that Women, in many Parts of *Germany*, pregnant, eſpecially, toward the latter End of their Time, generally chooſe to bleed by this Vein, from an Imagination that it occaſions leſs Injury or Weakneſs to the Fœtus.

Method of phlebotomiſing in the Hand.

II. When you are therefore determined from particular Reaſons to phlebotomiſe in the Hand, the Patient muſt firſt hold it in warm Water for ſome time, rubbing it therein well with his other Hand, in order to make the ſmall Veins become turgid and conſpicuous. After this you are to fix a Ligature upon the *Carpus*, that the Veins may continue in that Manner diſtended. When the Hand has been wiped dry with a Napkin, you make an Apertion in the moſt convenient Part of the Vein in the Manner we directed for Veins in the Arm. If the Blood does not flow copiouſly from the Orifice after Inciſion, the Hand ſhould be placed again in hot Water, and taken out when the Diſcharge is judged to have been ſufficient. This done, the Hand is wiped dry with a Napkin, the Orifice defended with two Compreſſes, and your Bandage applied as we ſhall direct in *Part* III. *Chap.* VI. *Sect.* X. on Bandages.

CHAP. IV.

Of BLEEDING *in the* FOOT.

The Veins opened in the Foot.

I. BLEEDING in the Foot is an Operation of very old ſtanding. It having been an Obſervation made by the moſt antient Phyſicians, that Phlebotomy in this Part proved highly ſerviceable in moſt Diſorders of the Head and Breaſt, and for an Obſtruction of the menſtrual and hæmorrhoidal Flux: Upon which Diſcharges greatly depended the healthy State of both Sexes. For theſe Reaſons they therefore denominated thoſe Veins of the Foot, *Saphena* and *Cephalica:* The laſt of which extends itſelf from the internal Ancle to the great Toe; and the firſt, from the external *Melleolus* to the ſmaller Toes. But why one of them ſhould be thought or denominated more cephalic than the other, there is not the leaſt Reaſon to be offered; ſince bleeding from either of them has altogether the very ſame Effect. Therefore, in my Opinion, the Surgeon ſhould always open that which lies faireſt and moſt conſpicuous. But if the Veins upon the *Metatarſus*, or Inſtep of the Foot, do not well appear, it may be then convenient to open one of thoſe at the Ancle, or about the Calf or Ham of the Leg, as I have frequently done myſelf. Nor is the Phlebotomiſt ſo liable to injure any of the Tendons in theſe laſt Parts as he is upon the *Metatarſus*. In the mean time the Operator ſhould, in ſingle Women, expect the Order of ſome prudent Phyſician for his bleeding by theſe Veins: Becauſe ſome of them, who are evil-minded, endeavour by this Means to procure a Miſcarriage; which, when known, might make the Phlebotomiſt a Sharer in the ill Report.

II. For

II. For the more easy and successful Apertion of these Veins, the Patient must first wash both Feet well for some time in hot Water: That when the Veins become sufficiently turgid, the Surgeon may take his Choice of that which presents fairest either in the Right or Left Foot, without paying any Deference to the Distinction of Right or Left, in any of the forementioned Disorders. For the Effect, as we observed, will be the same in either, if they are disposed with equal Advantage for Apertion. Having fixed upon the particular Foot and Vein, your Ligature must be applied about two Fingers Breadth above the Ancle; and then the Patient must return it into the warm Water while the Surgeon takes out and prepares his Instrument or Lancet. Then kneeling down on one Knee, the Surgeon takes out the Patient's Foot from the warm Water, and having wiped it dry with a Napkin, places it upon his other Knee, or else upon a Board laid over the Vessel of hot Water. He now fastens or secures down the Vein from slipping with his Left Hand, as in *Chap.* II. *Sect.* V. *& seq.* But if the Veins do not appear well under the Ancles, the Ligature must be removed higher, about two Fingers Breadth above where you intend to make the Apertion of the Vein which best offers itself. 'Tis to be also observed, with regard to the Surgeon's Posture, that he may seat himself on a low Stool or Chair, and place the Patient's Foot in the most advantageous Manner upon either Knee. This Method will be preferable to the other in Bleeding with the Spring-fleam, as many do in *Germany:* Or the Patient may here set the Foot for the Operation upon a low Stool, or any other Support. Manner of opening these Veins.

III. The Blood from the Vein thus opened may be received into a Glass Cup or Bason: And if it does not flow freely from the Orifice, the Foot should be returned into the warm Water; which will either prevent or dissolve the congealing of the Blood that in this Case often obstructs the Aperture. When a sufficient Quantity of Blood has been thus drawn, which may be known partly from the Time, and partly from the Largeness of the Stream, as also from the Redness of the Water, and Condition or Strength of the Patient; the Orifice is then to be closed by the Finger, and, after drying the Foot with a Napkin, to be secured by Compresses and Bandage. Concerning the Usefulness of Venesection in the Foot, consult the Dissertations of Perducius, Heredia, and Stahll, who have been opposed by Hecquet, *in Lib. sur la Saignée du Pied.* Paris. 1724. The first have been again seconded by *Jo. Bapt.* Silva *Medic. Paris. in lib. de l'usage des differentes sortes des Saignées*, Amstelod. 1729. Animadversions against this last were also published at *Paris* in 1730, by M. Chevalier, Physician, and Quesnay, a Surgeon there. Treatment after Apertion.

CHAP. V.

Of Bleeding *in the Veins of the* Forehead, Temples, *and* Occiput.

I. THERE are many Physicians and Surgeons, who think that bleeding by the Veins of the Forehead and Temples is much more serviceable and expeditious in relieving all Disorders of the Head, such as violent Pains, Vertigo, Delirium, Melancholy, and Raving Madness, *&c.* than the like Discharge When and how these Veins are to be opened.

by Veins more remote from the Parts affected; judging that their Vicinity renders them more capable of evacuating the offending Matter of the Diſeaſe. But, for my own Part, I muſt frankly own, that to me there ſeems to be little or no Foundation to expect any conſiderable Difference in the Effects of Bleeding from theſe Veins, in order to a more expeditious Removal of ſuch Diſorders: And this becauſe the external Veins of the Forehead and Temples have little or no Communication with the Brain and internal Parts affected, and do generally yield but a ſmall Quantity of Blood. In my Judgment, Bleeding by the jugular Veins ſeems more likely to anſwer that Intention, as they receive the Contents not only of the forementioned Veins, but alſo of thoſe immediately ſpent on the Brain and Parts affected, and are alſo more large and conſpicuous for Apertion. Yet if the Surgeon be expreſsly ordered by the Phyſician to phlebotomiſe in the Forehead or Temples, in compliance therewith, he ought to obſerve, that before he proceeds to inciſe the Veins, an Handkerchief or Neckcloth ought to be drawn tight round the Neck; that, by compreſſing the jugular Vein, thoſe Branches of it may become more turgid and conſpicuous. The Vein being opened, the Patient muſt hold down his Head, that the Blood may not trickle from his Forehead into his Eyes or Mouth, when the Stream does not ſpin out with ſufficient Force. If the Blood does not ſtop of itſelf after a due Quantity is diſcharged, you muſt compreſs the Orifice with your Finger; and, after wiping the Forehead and Face, apply a Compreſs or two, and then your Bandage.

Phlebotomy in the Occiput.

II. Bleeding from the occipital Veins, which communicate with the lateral Sinuſſes of the *dura Mater*, is both by Reaſon and Experience proved to be ſerviceable in moſt Diſorders of the Brain, where that Part is overcharged with Blood, which may be this Way diverted and evacuated. The celebrated Anatomiſt MORGAGNI [a] eſpecially recommends it, with Scarification and Cupping in thoſe Parts, for all lethorgic Diſorders: And ZACUTUS LUSITANUS gives an Inſtance of a deſperate Apoplexy removed by deep Scarification and Cupping upon the *Occiput*, *De Medic. Princip. Hiſt. Lib.* I. *Hiſt.* 33. Theſe occipital Veins are opened by the ſame *Apparatus* as the Vein of the Forehead.

CHAP. VI.

Of BLEEDING *in the* VEINS *of the* INNER CORNERS OF THE EYES.

When and how theſe Veins are to be opened.

IT is well known from Inſpection, and the Writings of Anatomiſts, that there are two Veins which run one on each Side the Noſe through the *Canthi Majores*, or inner Corners of the Eyes; which proceed partly from the Forehead, and partly from the Eyes, and do, like the frontal Vein, diſcharge their Blood down into the external jugular Veins. 'Tis [b] bleeding in theſe canthal Veins that has been univerſally approved by DIONIS and the Generality of Oculiſts for Inflammations and other Diſorders of the Eyes: But upon no better Foundation in my Opinion, than that of bleeding in the Forehead and Temples, (*Chap.* V.) However, when you are to phlebotomiſe in theſe Corners of the

[a] *Adverſar. Anat.* VI. *Animadver.* 83. [b] See his *Surgery*, Edit. 2. p. 494.

Eyes

Eyes, you must first make a Stricture about the Neck; and, after your Incision, the Patient must incline his Head, that a sufficient Quantity of Blood may be discharged from the Orifice without running into his Mouth: And then you apply a thick triangular Compress with Bandage. As for bleeding in the Veins of the Eyes, we shall consider that in treating of the Disorders incident to that Organ.

CHAP. VII.

Of BLEEDING *in* JUGULAR VEINS *of the* NECK.

I. IT has been a very antient Practice to bleed in the external Jugular Veins of the Neck, for most inflammatory Disorders of the adjacent Parts, for a Quinsey [a], Phrenzy, Madness, Ophthalmia, Apoplexy, inveterate Head-achs, Lethargy, and other Disorders of the Head. Nor are there wanting many among our modern Surgeons and Physicians to encourage the same Practice, and that even from the Authority of Reason and Experience: Since the accumulated and obstructed Blood and Humours may be this Way discharged from the Parts affected, and their bad Consequences prevented. Nor is the Operation at all dangerous; since the Jugular Veins run on each Side the Neck from the Head to the Clavicles, immediately under the Skin, and appearing generally very large, they may be easily perceived and opened: Before which you must make a Stricture upon the lower Part of the Neck with a Handkerchief, Neckcloth, or the common Ligature, which must be drawn tight by an Assistant or the Patient, to make the Vein turgid and conspicuous. Or you may place a loose Bandage about the Neck, and let it be drawn downward strongly over the Patient's Breast, either by himself or an Assistant: By which Means the Jugular Veins will be compressed on each Side, and become turgid without occluding the *Trachea*, or obstructing Respiration [b]. When and which Veins of the Neck are opened.

II. When the Jugular Veins have been by this Means rendered turgid and conspicuous, either of them which appears plainest may be secured by the Finger for Incision, either in the Right or Left Side of the Neck indifferently; when the Disorder lies in the whole Head, or in the Neck and Fauces. But when only one Side of the Head, or one Eye is affected, I think the Vein ought to be opened on the disordered Side of the Neck. The requisite Quantity of Blood being taken, the Ligature is next removed, and the Orifice compressed with your Finger, if the Blood does not stop without, while you wipe clean the Neck, and then apply your Compress and circular Bandage. Thus the Blood stops without any Danger of a fresh Hæmorrhage, of which some are without Reason afraid, as I have often experienced. Lastly, it must be acknowledged that the Patient faints away as readily after bleeding in the Neck, as the Jugular Veins are safely and easily opened: But no Danger follows from The Manner of incising the Jugulars.

[a] GOWEY reckons it a specific in this Case. See his *Surgery*, p. 274.

[b] While I am revising these Sheets for the Press, occurs a Woman to whom I prescribe bleeding in the Jugulars for a violent *Ophthalmia*; but upon applying the Ligature to her Neck, there is no Appearance of the Veins, an Accident I never before met with.

thence

thence. We have an excellent Treatiſe on the Uſefulneſs of bleeding from the Jugulars, publiſhed at *Breſlaw* in 8vo. 1735, by TRALLESIUS, a learned Phyſician of that City.

Of BLEEDING *in the* VEINS, *called* Ranulæ, *under the Tongue.*

IT is very often found of no ſmall Service in a Quinſey, or other inflammatory Diſorder of the Neck to bleed in the two ſmall Veins which run under the Tip or End of the Tongue: Eſpecially if a larger Vein has been opened before, either in the Neck, Foot, or Arm, whereby the inſpiſſated and ſtagnating Blood may be gradually evacuated. To bleed in theſe Veins, a Stricture being made upon the Neck as before, you then elevate the *Apex* of the Tongue with your Left Hand, while, with the Lancet in your Right, you circumſpectly open firſt one, and then the other on each Side: Becauſe the Apertion of one only will hardly ever diſcharge Blood enough to give any conſiderable Relief. When you judge a ſufficient Quantity of Blood has run out of the Mouth into your Veſſel, remove the Ligature from the Neck: Upon which the Flux uſually ſtops of itſelf. But if it ſhould ſtill continue, let the Patient take a little Vinegar, or *Frontiniac* Wine in his Mouth: Or elſe you may apply a bit of Vitriol or Allum, or a Compreſs dipt in ſome ſtyptic Liquor, till the Hæmorrhage ceaſes: Which can never be dangerous even without ſuch Topics. For if there be not a good large Quantity of Blood diſcharged in the inflammatory Diſorders of theſe Parts, the Apertion of theſe Veins will be of little or no Signification. Yet there are Inſtances where Patients have died for want of ſtopping Blood in theſe Veins. See *Mix. Nat. Cur.* A IV. *Obſ.* 101. and *Ephem. N. Cent.* I. p. 188.

CHAP. IX.

Of PHLEBOTOMY *in the* PENIS.

BLEEDING in the *Vena dorſalis Penis* uſually ſurpaſſes the Benefit of all Remedies whatever in abating inflammatory Diſorders of this Member. This large Vein, which runs along the Back or upper Side of the *Penis*, being generally pretty much diſtended, and conſpicuous in an Inflammation of this Part, may be inciſed about the Middle or back Part of the *Penis*; and kept bleeding till the Member becomes flaccid, and a ſufficient Quantity of Blood be diſcharged proportionable to the Urgency of the Symptoms. This done, you muſt apply a Compreſs, and the Bandage proper for the *Penis*, as we ſhall direct in the third and laſt Part of our Surgery. But you muſt carefully endeavour to avoid injuring the Arteries or Nerves which enter the *Penis* near this Vein: As alſo not to make your Bandage too ſtrict. For by theſe Means the Inflammation and Symptoms may turn out worſe than before.

Of

Of the Symptoms or Accidents which attend Phlebotomy.

CHAP. X.

Of an Ecchymosis.

I. MANY are the Accidents which may follow from the Apertion of a Vein. But we shall here only consider the Principal, and begin with an Eccymosis, or Extravasation of Blood from the Vein betwixt the Flesh and the Skin: Of this there may be various Degrees: So that the Arm hereby often becomes not only much swelled, and of a black and blue Colour, but is even sometimes violently inflamed with a most acute Pain, and followed either with a Suppuration, or incipient Mortification in the Limb. Ecchymosis, what.

II. The Accident we are now treating of frequently proceeds from the Vein having been cut quite asunder by the Phlebotomist: But oftner from the Patient's using his Arm too early after bleeding, in violent and long Exercises; in which the Contractions of the Muscles make the Veins swell, and force their Blood through the Orifice into the Interstices betwixt the Flesh and Skin, either in a greater or less Quantity, in proportion to the Degree of Violence and Exercise. Causes.

III. In a slight Ecchymosis or Effusion of Blood under the Skin, there is little or no Danger to be feared, as the stagnant Blood may be generally dispersed without any great Difficulty by the Application of a Compress dipt in Vinegar and Salt, or in Spirit of Wine. Sometimes the Blood suppurates or turns to Matter, which may be much promoted by a *Diachylon* Plaster: And when the Matter is once brought to Maturity, it generally makes its own Way through the Integuments, without the Assistance of any Incision: After which, being discharged, the Wound may be healed with a bit of *Diachylon* Plaster. Consequences of a slight Ecchymosis.

IV. If the Quantity of Blood stagnating in an Ecchymosis be very large and considerable, there is generally but little or no Hopes left to disperse it: But the Disorder too often terminates either in a large Abscess or a Gangrene, after violent Pain and Inflammation have preceded. But to prevent these Consequences, the Surgeon must take his Scalpel, and scarify, or make many little Incisions upon the livid Part to discharge the extravasated Blood; and then apply either a *Diachylon* Plaster, or the Fomentation before recommended for Contusions and Phlegmons, *Part* I. *Book* I. *Chap.* XV. *Sect.* X. & seq. *Book* IV. *Chap.* II. *Sect.* XIV. But if the Arm is already possessed with a violent Inflammation or Gangrene, you ought to scarify it well, and then to invest it with discutient Cataplasms or Fomentations, as we before directed in *Part* I. *Book* IV. *Chap.* XIV. *Sect.* VI. But at the same time in these Cases it is often necessary to bleed in some other Part, and to administer attenuating Medicines internally, till the Inflammation abates, or the Gangrene spreads no farther. You will see more on this Subject, *Chap.* XII. *Sect.* XVI. Treatment of a large Ecchymosis.

CHAP. XI.

Of the PUNCTURE *of a* NERVE *or* TENDON *in Phlebotomy.*

Signs of this Accident.

I. WHAT grievous and cruel Symptoms may ariſe from the pricking a Nerve or Tendon, we have before intimated, in treating of Wounds, *Part* I. *Book* I. *Chap.* I. *Sect.* X. and XI. But you may reaſonably judge, that a Nerve or Tendon has been injured in Bleeding, if the Patient, at the Time of Inciſion, feels a moſt acute Pain, ſo that he can ſcarce refrain from a ſevere Outcry. In a ſhort Time after, the excruciating Pains ſtill continuing, the Limb ſwells, becomes inflamed, convulſed, ſtiff, and extended as in the Cramp; which Symptoms, if not timely relieved, threaten Convulſions of the whole Body, a Gangrene of the Part, and Death itſelf.

Treatment.

II. Among the ſeveral Methods of treating theſe Symptoms, from ſuch an Accident, that ſeems to be one of the beſt, which was formerly uſed for the *French* King, CHARLES IX. by his Surgeon AMB. PAREY. For the King had no ſooner declared his intenſe Pain, by crying out aloud, while the Vein was opening, than PAREY imagined, with good Reaſon, that ſome Nerve was injured: And accordingly, the Arm began to ſwell in a little Time with excruciating Pains, and at length became quite rigid. Hereupon the King's Phyſicians were immediately called in to a Conſultation with PAREY, and the Treatment agreed on was firſt to bathe the Part injured with warm *Ol. Terebinth cum Sp. Vin. rect.* and then to inveſt the whole Arm in *Emplaſt. Diachalciteos in Ol. & Acet. Roſar. ſolut.* retained by the expulſive Bandage, which, beginning upon the Hand, aſcends gradually by ſpiral Turns to the Top of the Shoulder. By this Means the Impulſe of the Blood on the Part was not only much abated, but alſo the Pain and Inflammation much diminiſhed. And laſtly, to compleat the Cure, the following Cataplaſm was ordered to be applied to the Arm:

℞. *Farin. Hord. Orob. ana* ℥ ij. *Flor. Chamæmel. Melilot. ana* M ij. *Butyr. recent.* ℥ jſs.

Theſe boiled into a Cataplaſm with Soap-ſuds, were applied to the Arm, till the Pain, and other malignant Symptoms, were totally removed. Notwithſtanding which, the King had a Stiffneſs in moving his Arm for near three Months afterwards: But, by Degrees, that went off, and his Arm grew as ſtrong and agile as ever.

A ſecond Method of Cure.

III. Equal Succeſs may be alſo expected from treating the Part with warm *Hungary* Water and *Balſ. Peruv.* for ſeveral Days, till the Pain goes off: And as the *Diachalciteos* Plaſter is ſeldom retained in many of the Apothecaries Shops, you may ſubſtitute *Emplaſt. de Minio vel Saturninum & Diapompholygos.* But great Care muſt be taken, in the mean time, while theſe Remedies are preparing, not to expoſe the Wound open to the Air. Therefore the Wound may be at firſt covered with a bit of any Sort of Plaſter, and the whole Arm inveſted with a Linen Cloth moiſtened with Oxycrate; which will both abate the Inflammation, and exclude the Injuries of the Air or Duſt from the Part. If the Patient be young, and of a full Habit, it will be alſo proper, at the ſame time

time, to bleed plentifully in the other Arm. SCULTETUS, *Obſ.* 83. has an Ointment which he much extols for Punctures of the Nerves, as you may there find: Where he alſo relates, that he has ſeveral Times ſucceſsfully cut through, or totally divided, ſuch punctured Nerves.

CHAP. XII.

Of WOUNDS *of the* ARTERIES *in* PHLEBOTOMY.

I. IN Bleeding, it ſometimes happens, that an Artery is pitched upon and opened inſtead of, or together with, the intended Vein, and this more eſpecially when the Surgeon bleeds in the baſilic Vein of the Arm; near to which uſually runs the large brachial Artery [a], an Apertion whereof muſt be followed with a dangerous Hæmorrhage, an Aneuriſm, or even Death. This HILDANUS [b], with myſelf and others, has often obſerved, either from the profuſe Hæmorrhage, or from a Sphacelation of the Limb from the Courſe of the Blood being interrupted. That an Artery is thus accidentally opened inſtead of a Vein, you may diſcover by the Blood's ſpinning very forcibly from the Orifice, by Starts or Leaps, rather than in an even Stream, and extending itſelf into a greater Arch from the Orifice to the Receptacle: The Colour of the Blood is alſo here much more florid, or of a brighter red, than that from a Vein. To which add, that if you here preſs your Finger on the Veſſel below the Orifice, the Blood ſtarts out more violently than before, and quite ſtops; or elſe greatly diminiſheth upon preſſing above the Orifice. The Reverſe of this is found in the Apertion of a Vein. *Diagnoſis.*

II. In caſe of ſuch a dangerous Accident, the Surgeon muſt firſt endeavour to keep up his Preſence of Mind, which is very apt to be confuſed by Fear, that thereby the Patient, or his Attendants, may not ſuſpect his Error. In the next Place, he muſt carefully obſerve, whether the Blood flows freely from the Orifice, or whether it inſinuates, in a conſiderable Quantity, betwixt the Integuments. If the firſt, he muſt take a large Quantity of Blood, even till the Patient faints, perſuading him and his Attendants, that his Blood appears ſo hot and redundant, as to make ſo large an Evacuation abſolutely neceſſary, after the Example of M. DIONIS [c], when he met with this Accident. When the Patient is in a Deliquium, as the Flux then ceaſes, you may commodiouſly dreſs and bind up the Wound, and by this Precaution hinder a freſh Hæmorrhage, or an Aneuriſm. While the Attendants are otherwiſe employed, the Surgeon muſt place a Farthing, or ſome other Piece of Money, in the Folds of the firſt Compreſs, which being fixed on the Orifice of the Arm wiped clean, he muſt, upon the firſt, place two, three, or more thick Compreſſes, each larger than the other: And then bending the *Cubitus*, he muſt, for the greater Security, apply two Bandages, in the ſame manner as after bleeding in a Vein, only a little tighter. It may be next proper to lay a thick, long, and narrow Com- *What the Surgeon muſt do in ſuch a Caſe, when undiſcovered to others.*

[a] But I have alſo ſometimes obſerved this Artery near the Cephalic Vein.
[b] *Obſ.* 44. *Cent.* III. & LANCISIUS, Lib. *de Cord. & Aneuriſm.*
[c] In his *Surgery*; *Chap.* of *Veneſection.*

preſs upon the Arm, over the Artery, from its Inciſion to the *Axilla*, and to ſecure it in that Poſition by a ſpiral Bandage: That the brachial Artery being thus compreſſed, the *Impetus* of the Blood on the Wound may be abated; ſignifying to the By-ſtanders, that the Patient's Blood is ſo ardent and rapid, that it cannot well be reſtrained from bleeding again, without this particular Deligation. Thus perhaps his Error may eſcape unſuſpected. Inſtead of the firſt Compreſs with a Piece of Money, you may apply with equal, or more Advantage, a Lump of brown Paper chewed in your Mouth, and then the Moiſture preſſed out of it, ſecure it on the Orifice by ſeveral Compreſſes, and the Bandage as before.

Treatment of the Patient afterwards.

III. The Deligation being compleated, if the Patient does not then recover from the Swoon of himſelf, the uſual Means are to be uſed to recover him, by ſprinkling cold Water in his Face, opening the Windows, applying Volatiles, Vinegar, or *Hungary* Water to his Noſtrils, *&c.* By which means, being brought to himſelf, he muſt be ſtrictly charged to refrain from Exerciſe, to live on a ſpare and thin Diet, and not to uſe his Arm for ſome time, leſt a Relaxation of the Bandage might occaſion a freſh Hæmorrhage, or an Aneuriſm. To avoid this, it may be alſo requiſite to ſuſpend the injured Arm a little bent in a Sling about the Patient's Neck: And to keep it the more ſteddy, the Sling may be pinned to the Patient's Clothes, and at Night laid in a convenient Poſture on a ſoft Pillow.

Frequent Viſits neceſſary.

IV. A few Hours after the Deligation, the Surgeon ought to viſit his Patient, and again, at ſhort Intervals, as often as he conveniently can, in order to inſpect the Arm and Bandage, to ſee that the latter ſits tight, and to prevent the Inſult of a freſh Hæmorrhage, Pain, Tumor, Inflammation, Gangrene, or other bad Symptoms. If every thing appears right, except only a ſmall, uniform, and ſoft ſwelling of the Arm, the Bandage ought nevertheleſs to remain on the Arm, till the fourteenth Day: For ſuch a Swelling does not preſage any thing amiſs, even though it infeſts the whole Arm. But if your Bandage is perceived to get looſe, it ought to be taken off cautiouſly, and re-applied more cloſely. But while the Bandage is taken off from the Arm, the Artery ought to be compreſſed by the Tourniquet, or at leaſt by the Thumb of an Aſſiſtant, graſping the Arm; the Surgeon in the mean time holding his Thumb or Finger preſſed on the Wound, till he re-applies either the ſame or freſh Compreſſes and Bandage. But in this you muſt be careful not to force off the laſt Compreſs or Lump of brown Paper from the Inciſion, if it does not fall off of itſelf, but rather let it remain. However, if it ſhould ſeparate, you may dreſs the Wound with a little *Balſ. Peruvian. vel Capaiv.* till it is well cloſed, and out of Danger, nor liable to a freſh Hæmorrhage. If you come to your Patient, and find his Arm bleeding, the Trunk of the brachial Artery muſt be immediately compreſſed, either by the Tourniquet, or with the Thumb and Fingers of an Aſſiſtant fixed about the Middle of the Arm: And having provided more or thicker Compreſſes, and a longer Bandage, you then take off the old Dreſſings, waſh clean the Wound with warm Wine, or its Spirit, and next proceed to renew your Deligation more carefully, as we before directed. If the Surgeon meets with the Appearance of a Gangrene from too great a Stricture of the Bandage, he muſt unbind and foment the Arm, or treat it with the

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Remedies proper for that Caſe, and, augmenting the Number of his Compreſſes, re-apply his Bandage more cloſely than before. But if the Gangrene proceeds from a Loſs of the Circulation through the Limb, by a Defect of the other arterial Trunk of the Arm, which ſeldom happens, in that Caſe you muſt amputate without delay.

The Patient's Regimen.

V. If the Surgeon meets with none of the forementioned Symptoms, for ſome time after his Deligation, he muſt order the Patient to keep on the Bandage for a Week or a Fortnight longer, keeping his Arm, in the mean time, free from Exerciſe or Motion: Leſt the Blood ſhould, by that Means, force and extend the as yet tender *Cicatrix* into an Aneuriſm. His Diet muſt alſo be all along ſpare and light, as at the beginning; ſtrictly avoiding all Wines and fermented Liquors, and every thing that will put the Blood into a violent Commotion: In which laſt Caſe the Surgeon will find it neceſſary to bleed in another Part. Thus you may avoid all Danger of an Hæmorrhage, or an Aneuriſm; and the Parient's Arm will become as well as ever, eſpecially, if the Wound be dreſſed with a little *Balſ. Peruv. vel Capaiv. &c.*

What muſt be done if the Error is detected.

VI. Thus far have we deſcribed the Method, in which the Surgeon muſt proceed, when the Error is not diſcovered by the Patient, or his Attendants. But if either of them have ſmelt out the true Caſe, it will be the beſt Way for him to make a free Acknowledgment of his Miſtake or Accident, excuſing the ſame, by aſſuring them, it is no more than what may happen to the moſt expert Surgeon living, in opening ſome Veins: And then promiſing the Patient, that if his Directions are obſerved, he ſhall be perfectly cured, without any Damage: And thus he may compleat his Cure, perhaps better than if his Patient knew nothing of the Matter: For knowing the Caſe to be ſo much more dangerous than that of an inciſed Vein, the Patient will be more ſubmiſſive, and the Surgeon's Orders more punctually obſerved.

Treatment when the Blood inſinuates betwixt the Fleſh and Integuments.

VII. When the Aperture of the Artery, and that of the Integuments, do not exactly correſpond with each other, but the Blood being forced out of the Artery, inſinuates itſelf betwixt the Fleſh and Skin; in that Caſe, which very often happens, the Patient muſt not be bled *ad Deliquium*: For even after that, there may be ſo much Blood extravaſated and retained betwixt the Integuments and Muſcles, as may cauſe a Mortification of the Arm by its Putrifaction, or at leaſt may render the Operation for an Aneuriſm abſolutely neceſſary to be performed. If therefore the Surgeon cannot draw back the Orifice or Inciſion of the Integuments, ſo as to make it correſpond with that of the Artery, and diſcharge the retained extravaſated Blood, he ought immediately to compreſs the Wound with a Lump of chewed Paper, and ſeveral Compreſſes, each larger than the other, which are all to be firmly ſecured on the Part by the Bandage or Deligation before deſcribed at *Sect.* II. of this Chapter; not forgetting the long Compreſs and Bandage, which we recommended for compreſſing the brachial Artery. Then, after bleeding plentifully ſeveral Times, in ſome other Part, the Remainder of the Treatment may be according to *Sect.* III, IV, V, and VI. preceding. But the Patient muſt be viſited again in a little Time, to inſpect the Arm; For it often happens, that when you have no apparent Bleeding after Deligation, yet the Blood will inſinuate itſelf betwixt the Muſcles and Integuments, ſo as to diſtend the Arm to an enormous Size. A remarkable In-

ſtance

ſtance of this DIONIS[a] gives from his own Practice. He was once obliged, in this Caſe, to inciſe the Integuments of the whole Arm, whereby he diſcharged four Pounds of Blood, that had been equally diſperſed all round, from the Elbow to the Shoulder. And we alſo meet with a ſimilar Obſervation in RUYSCH[b], in which concreted Blood was lodged almoſt all over the Arm. You may alſo conſult BARTHOLIN. *Epiſt. Med.* 53. *Cent.* III. *Hiſtor. Anatom.* IX. *Cent.* II. and his Hiſtory of an Aneuriſm diſſected, which he ſaw at *Naples*, *An.* 1644.

CHAP. XIII.

Of ANEURISMS.

What an Aneuriſm is.

I. A Throbbing Tumor, diſtended with Blood, and formed by a Dilatation, Wound, or Rupture of an Artery, is by Surgeons uſually denominated an *Aneuriſm:* Of which they diſtinguiſh two Kinds, the *true*, and the *ſpurious*. A true Aneuriſm has always a Pulſation, more or leſs, and is formed by a Dilatation only of the Artery, either all around[c], or on one Side of it, much in the ſame Manner as thoſe analogous Tumors of the Veins are formed, which we term *Varices*. So that both Aneuriſms and Varices are a Kind of *Herniæ* of the Arteries and Veins, and accordingly they are by ſome named *Herniæ Arteriarum & Venarum*. But the ſpurious Aneuriſm, is, when the Artery being opened by a Puncture, Wound, Contuſion, Eroſion, or other external Violence, extravaſates the Blood betwixt the Muſcles and Integuments, the Limb itſelf appearing livid, and much ſwelled thereby. A true Aneuriſm may alſo degenerate into one that is ſpurious, by a gradual Dilatation of the Artery, and Extenuation of its Coats, till at length being totally ruptured, the Blood is either extravaſated and retained under the Integuments, or diſcharged freely from the Wound. Hence the Tumor is much larger and leſs prominent, or pointed in the ſpurious, than in the true Aneuriſm, and is alſo attended with little or no ſenſible Pulſation: But the Putrefaction of the extravaſated Blood very often occaſions a Gangrene and Mortification of the Part, or even Death itſelf, by a profuſe Hæmorrhage. But Aneuriſms may be again diſtinguiſhed from their Circumſtances and Symptoms, into *ſimple* and *complicated*. The firſt are formed without any ill Accidents: The laſt are uſually attended with Immobility, violent Pain, an Abſceſs or Sphacelation of the Part, *&c.* which

[a] *Chirurg. Operat. Demonſtrat.* VIII. Chap. of Aneuriſms. [b] *Obſ. Anat. Chirurg.* Obſ. 2. pag. 7.

[c] 'Tis a little extraordinary that the learned Dr. FREIND ſhould, in his Hiſtory of Phyſic, contend that all Aneuriſms are formed by a Rupture of the Artery; when we have ſo many Inſtances of their ariſing from a Dilatation only of the arterial Coats, either on one or all Sides. See that deſcribed by me in *Annal. Acad. Juliæ Semeſtri* XII, p. 81. Thoſe in PAREY's Surgery, and RUYSCHII, *Obſ. Chirurg. & Hiſt. Acad. Reg. An.* 1712 & 1721. Alſo LANCISI *Lib. de Corde & Aneuriſmat. & Lib. de Mortib. Subitan. in Schol. Obſ.* 5. §II.

more

more usually accompany the spurious Aneurism [a]. Aneurisms may be also distinguished, from the Situation of the Arteries, into *external* and *internal* [b], the first being accessible, the others not. Another remarkable Difference of them may be taken from their having either a violent or else but little or no sensible Pulsation [c]. For it is to be observed, as we before mentioned, that spurious Aneurisms seldom have any considerable Pulsation, especially when they are large; whereas the true Aneurisms, especially the small, have a very strong and sensible Pulsation: But in some of them the Pulsation increases, and in others it diminishes, as the Tumor enlarges. See my Account in *Annal. Acad. Juliæ Semestri* XII. *pag.* 81.

II. In a true and external Aneurism, besides the forementioned Signs, we observe a small Tumor at the Beginning, no larger than a Filbert, which has always a Pulsation. (As for the internal Species, as they lie concealed from our Senses, little or nothing can be said of their Signs, with which, however, the Reader may be supplied in LANCISI's Treatise on the Subject.) The Tumor generally feels soft to the Fingers, with a Sort of Fluctuation and Resistance of a Fluid, and is almost constantly of the same Colour with the Skin, having a Pulsation like that of the Artery to which it belongs. Upon pressing the Finger on the Tumor, as yet small, it disappears: And upon removing the Finger it returns instantly again. But the spurious Aneurism appears livid, feels hard and turgid, with intense Pains: The Tumor is here more plain or equal, and generally without Pulsation, as upon pressing it affords a Sort of rumbling or fluctuating Noise; and distending the whole Limb, or a great Part thereof, to an unusual Size [d], it very often either degenerates into an Abscess or a *Sphacelus*. *Diagnosis.*

III. Aneurisms most frequently arise in the brachial Artery, from an erroneous Puncture or Injury thereof, in bleeding in the Arm, especially in the Basilic Vein. For the Artery being in a constant Pulsation, will, by urging its Blood against the arterial Coats, gradually distend them where they make too little Resistance, so as at length to form a considerable Tumor. If therefore a throbbing or beating Tumor like that described in the foregoing Paragraph should appear in the Arm a few Days or Weeks after bleeding, it may be certainly depended upon to be an Aneurism. But the Origin of Aneurisms is not from the Lancet alone; nor is their Seat restrained to the Arm only [e]; for The Seats and Causes of Aneurisms.

[a] A remarkable Aneurism of the spurious Kind is described by BARTHOLIN in a professed Dissertation, entitled, *Aneurismatis Dissecti Historia*, Panormi 8vo. 1644. See also VAN HORNE *in Epist. de Aneurismate*; and LANCISIUS, *Lib. de Cord. & Aneurism.*

[b] Histories of internal Aneurisms may be seen in PAREY, *Book* VII. *Chap.* 32. Monf. BLEGNI, *Zodiac. Med. Gallic. An.* 1681, *p.* 44. RUYSCH. *Obs. Chirurg.* 37 LANCISII. *Et Annal. Acad. Juliæ locat.*

[c] Of which I have made many Observations besides those in PAREY, *loc. cit.* RUYSCH. *Obs.* 38. BLEGNI, *l. c. p.* 25. & 42. NUCK *Operat. Chirurg. Exper.* XXIX. LANCISII, *l. c.*

[d] The spurious Aneurism often acquires an enormous Size, but the true one hardly ever exceeds the Bulk of a Chesnut, according to GOUEY, *Chirurg. pag.* 231. But that his Opinion is not to be absolutely depended on, may appear from the several Accounts we have of larger Aneurisms, particularly one the Size of a Goose Egg in HILDANUS, *Obs.* 44. *Cent.* III. PURMANNUS *Chirurg. curiosa*, p. 212. And in our *Tab.* XI. *Fig.* 6.

[e] AMB. PAREY, *Lib.* IV. *Cap.* 32. asserts the Neck to be the Part in which Aneurisms are most frequently formed; but his Opinion is not countenanced by our latter Experience and Observations.

they may ariſe from an infinite Number of Cauſes, both external and internal, and may be formed in all Parts where there are any arterial Trunks, or conſiderable Branches diſtributed. Thus we often meet with them from a Wound, Contuſion[a], and Suppuration, and from external Injuries in moſt Parts of the Body. But internally they may ariſe either in the Thorax or Abdomen, from a Diminution of the Strength and Reſiſtance of the external or internal Coats of the large arterial Trunks, from various Cauſes, as an Ulceration, Eroſion, *&c.* agreeable to the Obſervations of FALLOPIUS, (*Lib. de Tumor. Cap.* 14.) SEVERINUS (*Lib. de Abſceſſibus*) RUYSCH *Obſ.* 37. & 38. LANCISI (*Lib. de Cord. & Aneuriſmat.*) and our Obſervations in *Annal. Acad. Juliæ Semeſtri* XII. p. 81. We muſt however confeſs, that the Cauſes of internal Aneuriſms are often very doubtful and unſettled: Notwithſtanding which, we ought to diſtinguiſh thoſe Cauſes as they occur, into external and internal. They often proceed from a Blow, Fall, or a Fracture of the adjacent Bone, or a violent Straining in lifting great Weights, Jumping, Riding on Horſeback, *&c.* whereby the Blood is accumulated and urged ſo forcibly in the Artery injured, as gradually to diſtend its Coats, and form a Tumor. Sometimes they are owing to an Inflammation, Suppuration, Eroſion, or Ulcer in ſome neighbouring Part, or in a Part of the Artery itſelf: By which the other Coats are ſo weakened, that they are unable to ſupport the Impetus of the Blood. Hence they give way, expand themſelves, and ſwell. In the ſame manner too we often meet with Aneuriſms from a ſlight Puncture, or even barely touching the Coats of an Artery with a Lancet in opening a Vein: In which Caſe the exterior Coat of the Artery being divided, and the interior remaining entire, the latter is not alone ſtrong enough to reſiſt the Impulſe of the Blood, but gives way inſenſibly at each Ictus of the Artery, till it at length forms that conſiderable Tumor which we call an *Aneuriſm.* If we therefore conſider that the mechanical Formation of Aneuriſms is in this Manner from a diminiſhed Reſiſtance in the arterial Coats, we ſhall find the Cauſes thereof very numerous, which may weaken an Artery more in one Part than another; ſo as to make it give way to the Force of the Heart, or Impulſe of the Blood, and form an Aneuriſm. And this eſpecially, when ſeveral Cauſes concur together, as if violent ſtraining or leaping, *&c.* be uſed when the Coats of the Artery are previouſly extenuated or weakened by a Contuſion, Inflammation, Suppuration, *&c.*

Diagnoſis of injured Arteries.

IV. I think we have in the preceding Chapter ſufficiently explained the Manner of enquiring into the greater Injuries and Wounds of the Arteries, that may happen in opening a Vein. We ſhall here only enumerate the Signs by which we may diſcover ſlight Punctures, or the ſmaller Injuries of them, which occur in Phlebotomy. But as we are not ſupplied with any certain or characteriſtic Signs indicating ſuch ſlight Accidents, we muſt make the beſt Uſe of a reaſonable Conjecture. If therefore you ſhould perceive a Pulſation againſt the Point of your Lancet, notwithſtanding you have no Hæmorrhage from the Artery, yet you may reaſonably conclude that the external Coat of that Veſſel muſt be in ſome Degree injured thereby: And therefore it will be proper to

[a] Thus FEHRIUS has obſerved an Aneuriſm in a Lad, from a Blow on the Left Side of his Head, which, in the Space of eight Days, enlarged ſo as to cover half his Head. *V.* BARTHOLIN, *Epiſt.* 53. *Cent.* III.

make

make your Deligation and Compreſſion to prevent an Aneuriſm, in the Manner we before directed in the preceding Chapter.

V. But if a ſmall beating Tumor ſhould be formed within the Space of a Month after Phlebotomy, either through the Neglect of the Surgeon or Patient, or from leaving off the Deligation too early, it may be pretty ſafely depended on to be one of theſe Aneuriſms from a ſlight Cauſe. But if it be a true Aneuriſm, whilſt it continues recent and ſmall, it gives little or no Uneaſineſs, beſides its Tumor and Pulſation: Yet when it has afterwards gradually acquired the Size of an Egg, or one's Fiſt, or even the Bulk of one's Head, as may be ſeen in PURMANNUS *Chirurg. Curioſ.* p. 612. and in our *Tab.* XI. *Fig.* 6. it then occaſions intenſe Pains, Weakneſs, Immobility, and other bad Symptoms in the affected Limb. If then the Help of the Surgeon be not ſpeedily called in, the arterial Coats becoming gradually extenuated, will at length burſt, and be followed by a Train of the worſt Conſequences, if not the Death of the Patient. If the external Integuments ſhould be broke through, a fatal Hæmorrhage muſt follow: And even if they ſhould continue intire, an Abſceſs or Gangrene would deſtroy the Part, as I myſelf have obſerved here in a Patient at *Helmſtadt*. See alſo RUYSCH, *Obſ.* 2. Though the Generality of Aneuriſms afford a dangerous Prognoſis, a [a] BARTHOLIN and [b] HARDER obſerve, yet none are ſo much to be feared as thoſe which are formed internally in the larger arterial Trunks, where there cannot be had a free Acceſs to the Parts, as in the *Aorta*, *Subclavian*, beginning of the axillary, brachial, and carotid Arteries [c], *&c.* Thoſe Aneuriſms too are generally incurable which are formed in the carotid Arteries of the Neck, in the Subclavian or Axillary near the Shoulder, and in the crural Artery, eſpecially if near the Abdomen. For if the Operation be performed on any of theſe, it muſt be followed either with a profuſe or fatal Hæmorrhage, or elſe a Mortification of the Parts. But thoſe Aneuriſms are much leſs dangerous, and frequently admit of a Cure which are formed in the external Branches of the Arteries, eſpecially in thoſe running on the *Cranium*, or without the Ribs, and thoſe in the Foot, Hand, or lower Arm. Yet if the Aneuriſm be not recent, though even in the Arm, the Succeſs of the Operation by the Knife will be at leaſt very uncertain, when Deligation and Compreſſion alone will not take their due Effect. For as the arterial Trunk muſt neceſſarily be cloſed or ſhut, it will be almoſt next to impoſſible to prevent the Parts, to which the Artery was diſtributed, from waſting away, or elſe from mortifying: Since the Circulation of the Blood, and their Supplies of Nouriſhment are by this means in a great Meaſure, if not totally, cut off; the lateral ſmall Branches of Arteries being incapable of importing a due Quantity of Blood to the Hand and Parts of the *Cubitus*, when one of the larger Branches is wanting [d]. This is therefore a frequent Cauſe of a Mortification in them, ſo as often to oblige the

Prognoſis.

[a] See BARTHOLIN. *Epiſt. Med. Cent.* III. *Epiſt.* 53. [b] Jo. JAC. HARDER, in *Apiar. Obſ.* 86.

[c] LE DRAN, *Obſ.* 40. *T.* I. relates, that he has found frequent Veneſection of great Service in an Aneuriſm of the *Aorta*. I have experienced the ſame.

[d] That the fellow arterial Branch of the *Cubitus* is not ſo often abſent as Surgeons have imagined, is made apparent, with other juſt Anatomical and Chirurgical Obſervations, in a Medical Diſſertation or Theſis had under me at *Helmſtadt*, by Dr MOEBIUS, *An.* 1730. the Subſtance of which I think to communicate in my Obſervations, which I intend to publiſh ſome time hence by themſelves.

Surgeon to an Amputation, as hath been frequently experienced by myſelf and others[a]; and even Amputation itſelf will very often not ſave the Patient, as may appear from the Caſe in BARTHOLIN, *Epiſt. 53. Cent.* When an Aneuriſm burſts ſpontaneouſly, the Hæmorrhage is generally ſo profuſe, that the Patient's Life may be loſt[b] in a Minute's Time, if a ſpeedy Compreſſion be not made on the Artery by a ſtrict Ligature, or the Tourniquet, and the Aſſiſtance of an expert Surgeon. And extremely dangerous is the Caſe when the Surgeon, by Neglect or Miſtake, inciſes one of theſe large Tumors inſtead of an Abſceſs, as hath been ſometimes done[c]. Yet it ought to be obſerved here, that ſpurious Aneuriſms are in the general much more dangerous than the true ones. True Aneuriſms are ſometimes tolerable without any great Danger or Uneaſineſs for many Years[d], or as long as the Patient lives; eſpecially if they are defended and ſecured with proper Bandage and Compreſſes: Whereas on the contrary, ſpurious Aneuriſms will not continue many Days without inducing an Hæmorrhage, Abſceſs, and Mortification in the Parts. But both the true and ſpurious Species of Aneuriſm are always the more dangerous and troubleſome as they are larger: Inſomuch, that their Size has deterred the expert and intrepid HILDANUS[e] from performing the Operation on them. And RUYSCH openly declares[f], that, in the vaſt City of *Amſterdam*, no Surgeon had undertaken to perform the Operation for above twenty Years before him. The ſpurious Aneuriſm is alſo more difficult to cure even by the Knife than the true Species: Becauſe the Blood which is extravaſated and concreted all around gives the Surgeon immenſe Trouble to diſcharge it. As for internal Aneuriſms, they not only lie concealed from our Senſes, but are alſo abſolutely deſtitute of any Help or Remedy from Art, becauſe they are inacceſſible to the Hand. But were an internal Aneuriſm to extend and ſhew itſelf externally, it could not be well ſubjected to the Operation, without greatly hazarding the Patient's Life: And therefore the Cure of ſuch have been prudently refuſed by the moſt eminent Surgeons, as FALLOPIUS, PAREY, SEVERINUS, *&c.* cited in BARTHOLIN's *Hiſtoria Aneuriſmatis Diſſecti.* And for the ſame Reaſon we here reſtrain our Doctrine and Treatment of this Diſorder to the external Species of Aneuriſms only. But they who deſire a more particular Account of the Internal, may conſult the learned Treatiſe on the Subject by LANCISI.

Treatment of ſlight Aneuriſms.

VI. I ſhall now, for the Information of the younger Surgeon, deſcribe the Method of treating an incipient Aneuriſm, forming itſelf in the Flexure of the *Cubitus*, or Bending of the Arm, where this Diſorder more frequently occurs than in any other Part: And from hence, I think, he may eaſily judge of the Method in which other leſs frequent Aneuriſms are to be treated. Whenever a ſmall Aneuriſm of the true Species begins to form, and ſhew itſelf at the Flexure of the Arm, you are furniſhed with two Methods of relieving it, either by Deligation, or by Inciſion. The firſt of which may be again performed

[a] V. RUYSCH, *Obſ.* 2. BARTHOLIN. *Epiſt.* & VAN HORN *de Aneuriſmate.*

[b] V. *Phil. Tranſact.* N° 402. *Act. Erud. Lipſ.* Tom. III. *pag.* 401. PAREY, *Lib.* VI. *Cap.* 32.

[c] V. PAREY, *Lib.* VI. *Cap.* 32. HILDANUS, *Cent.* III. *Obſ.* 43. RUYSCHII, *Obſ.* 38. VAN HORN & LANCISI, *loc. cit.*

[d] Thus SENNERTUS (*Prax. Med. Lib.* V. *Part* I.) gives the Caſe of a Woman who ſuſtained an Aneuriſm the Size of a Walnut on the Flexure of the *Cubitus*, without any Detriment, for the Space of thirty Years.

[e] *Cent.* III. *Obſ.* 44. [f] *Obſ. Chirurg.* 2.

either

either by Compreſs and Bandage, or by an Inſtrument adapted for the Purpoſe. The Method of relieving and curing this Diſorder by Deligation and Compreſſion, if there be no Extravaſation, ought always to be tried before that by Inciſion, as well in the incipient true as in the ſpurious Aneuriſm: For it would be barbarous to ſubject the Patient to a cruel Operation, for what may be remedied by a milder Treatment. The Patient may be therefore relieved, and the Tumor diminiſhed by Compreſſion, after diſcharging the extravaſated Blood, either with a Compreſs of chewed Paper, or a bit of aſtringent Plaſter, retained with the other Compreſſes and Bandage we deſcribed in the preceding Chapter. By which Means the Diſorder may be conſiderably diminiſhed, if the Deligation be continued on the Limb for ſeveral Weeks or Months: And thus we read of Cures performed as well formerly by HILDANUS (*Cent.* III. *Obſ.* 44.) TULPIUS (*Obſ. Med. Lib.* IV. *Cap.* 17.) ROGERUS, (*Zod. Med. Gall.* 1681. p. 43.) and others of the laſt, as well as of the preſent Century. But if Deligation be found inſufficient, as it was upon the *French* King's Phyſician, M. BOURDELOT (*Zod. Med. loc. cit.*) Recourſe muſt then be had to a particular Machine adapted to the Purpoſe of compreſſing the Aneuriſm; which if ſmall, may, by the Aſſiſtance of that Inſtrument and a ſtrengthening Plaſter, be compleatly cured. Among the ſeveral Inſtruments contrived for this Purpoſe, we have ſelected the two repreſented in *Tab.* IX. *Fig.* 8 and 9. the Uſe and Application of which may be better underſtood from Inſpection, than a verbal Deſcription. We have alſo, in my Opinion, ſufficiently explained it in our Expoſition of *Tab.* XI[a].

VII. If the Aneuriſm is too large to receive any Benefit from Compreſſure by Deligation, or the preceding Inſtrument; or, if a true Aneuriſm ſhould, by a Rupture of the arterial Coats, degenerate into a ſpurious one, attended with a livid Tumor from the extravaſated Blood, Immobility of the Arm, intenſe Pain, and the Danger threatened from an accidental or profuſe Hæmorrhage; in that Caſe the Patient can have no Relief, but from the Operation by the Knife. Which Operation, however, being attended with much Pain and Danger, ought not to be undertaken without great Care and Circumſpection, and with the Approbation or Advice of other eminent Phyſicians and Surgeons: Leſt, if the Succeſs thereof ſhould turn out worſe than expected, it might be raſhly attributed to Imprudence or Miſconduct in the Operator. Treatment of large Aneuriſms.

VIII. There are chiefly two Things required in the Operation: Firſt, a Removal of the Tumor or Aneuriſm; and then to conjoin or heal up the Wound in the Artery. In the laſt Century they uſed to amputate the Arm for an Aneuriſm in *Italy*, and then applied an actual Cautery to the divided Artery, as we are told by BARTHOLIN, in his *Hiſtor. Aneuriſmat.* But at preſent we endeavour to preſerve the Patient's Arm, and remove the Aneuriſm by a much milder Treatment. For the ſucceſsful Performance of this Operation, the Surgeon muſt attend chiefly to three Things: Firſt, to ſtop the Flux of Blood through What is required in the Operation.

[a] SCULTETUS alſo deſcribes and figures an Inſtrument for this Purpoſe, in his *Armament. Chirurg. Edit.* 4to, *Anno* 1666. *Tab.* XIX. *Fig.* 4. But his does not ſeem ſo well adapted as ours. DIONIS likewiſe mentions the Inſtrument contrived and uſed by Dr. BOURDELOT (deſcribed at large in BLEGNI's *Zod. Med. Gallic.* 1681. *pag.* 43.) for himſelf, by which *Ponton* or Bridge, he relates, that, within the Space of a Year, he was cured of an Aneuriſm in his Arm, as big as a Pullet's Egg.

the Artery by the Tourniquet, an Inſtrument unknown to the Antients: Secondly, to denudate the Artery, and free it from the adjacent Integuments; and, laſtly, to contract or conſtringe the ſame, either by Medicines or Ligature[a]. It will therefore firſt be neceſſary to have all the proper Inſtruments conveniently diſpoſed in Readineſs in a large Plate or Diſh, that there may be no Delays in the Operation. This *Apparatus* muſt take in a *Tourniquet*, to compreſs the brachial Artery, (ſee *Part* I. *Book* I. *Chap.* II. *Sect.* IX. and X. *& ſeq. ad* XV.) a *Scalpel*, *Tab.* I. G. and a Hook, *Tab.* VIII. *Fig.* 2. and 3. to denudate the Artery: To which add a Sponge with ſome warm Wine, or its Spirit, a Pair of obtuſe pointed Sciſſors, *Tab.* I, C, or D, ſome ſcraped Lint, ſquare Compreſſes of ſeveral Sizes, one narrow Compreſs of a Span in length, with two large Pieces of Linen to inveſt the Arm: And, laſtly, two or three Rollers of two Fingers breadth, and thrice as long as for Phlebotomy in the Arm. But if the Artery is to be contracted by Aſtringents or Cauſtics, the Succeſs of which is very dubious and uncertain, you muſt then enlarge your *Apparatus* with ſome *Vitriolum Romanum*, *Butyrum Antimonii*, *&c.* Or if you ſecure the Artery by Ligature, which is the ſafeſt and univerſal Practice of the Moderns (becauſe the Eſchar made by Cauſtics has been often obſerved to give way, and excite a fatal Hæmorrhage) inſtead of Aſtringents or Cauſtics, you muſt then provide a crooked Needle armed with ſome ſtrong waxed Thread, twice or thrice doubled; or, inſtead of a Ligature, by a Needle and Thread, you may apply the particular Inſtrument invented by me for this Purpoſe, and repreſented in *Tab.* VIII. *Fig.* 4.

How the Patient and Aſſiſtants are to be diſpoſed.

IX. Your *Apparatus* being prepared, the Patient is next to be ſeated in a Chair, leaning back with his Arm extended, in the ſame Manner as for Phlebotomy. Then you muſt place four Aſſiſtants round him, in the moſt advantageous Poſition: And when the Aneuriſm is in the Right Arm, it is, in my Opinion, beſt for the Surgeon to ſtand on the Right Side of the Patient, placing the moſt expert of the Aſſiſtants next him, to hold the diſordered Arm above the Tumor, together with the Tourniquet applied to it; that he may increaſe or diminiſh his Stricture on the Arm by that Inſtrument, as the Surgeon ſhall direct. One of the other Aſſiſtants ſtanding before the Patient, is to hold the Arm faſt by the *Carpus*, that he may not flinch, or withdraw it in the Operation. A third Aſſiſtant is to ſtand on the Left Side, holding the *Apparatus* of Inſtruments. The fourth, or laſt Aſſiſtant, muſt be ready to do any thing the Surgeon may find neceſſary to direct him, during the Operation. But if the Aneuriſm is in the Left Arm, the Surgeon and Aſſiſtants are to be diſpoſed in the reverſe Order, as any one may eaſily direct.

Application of the Tourniquet.

X. The firſt Part of the Operation conſiſts in applying the Tourniquet about the Middle or upper Part of the *Humerus*, ſo as thereby gradually to compreſs the brachial Artery, (ſee *Tab.* III. *Fig.* 1. K) till you can perceive no Pulſation either in the Artery at the *Carpus*, or in the Aneuriſm itſelf. By which means you will be ſure to avoid any conſiderable Hæmorrhage: But you muſt be careful to moderate your Stricture by the Tourniquet, ſo as not to injure the Nerves, or other ſenſible Parts. The Stick, by which the Tourniquet is twiſted,

[a] Surgeons formerly cloſed the Artery, by cauterizing with a red-hot Iron; but that is a Method too cruel, and is, at the ſame time, not ſecure, and often has pernicious Effects.

muſt be held by an Aſſiſtant on the Right Side; or if you uſe the Screw Tourniquet, repreſented in *Tab.* V, and VI. that will remain faſt on the Arm, without holding. But it ſometimes happens, as GARENGEOT obſerves in his Surgery, *Chap.* on Aneuriſms, that the Tourniquet cannot be ſafely applied to the Arm in a ſpurious Aneuriſm, by reaſon of the great Extravaſation and Tumor. In that Caſe you may therefore, as the Author directs, apply the Tourniquet over a Ball and Compreſs in the *Axilla*, ſo as to compreſs the Artery, by twiſting the Stick of the Tourniquet above upon the Shoulder.

XI. When the Tourniquet is properly fixed and tightened upon the Arm, there are then three Methods of performing the Operation. The firſt of theſe is, by laying open the true Aneuriſm by a longitudinal Inciſion, continued upward and downward by the Scalpel, according to the length of the compreſſed Artery: Which done, you are to remove the vitiated Blood or Matter therein lodged, either by your Fingers, the Probe, or a Sponge. The Parts being thus cleanſed, you muſt, in the next Place, ſlacken the Tourniquet a little, that the ſalient Blood may demonſtrate the upper Orifice of the Artery to you. And in doing this, you need not conſtringe your Tourniquet again immediately, if the Patient be ſtrong, and of a full Habit: But rather permit the Artery to diſcharge a few Ounces of Blood, more or leſs, as may be thought proper. When you have again tightened your Tourniquet, ſo as to exclude the leaſt Hæmorrhage, if your Intention is to treat the Diſorder by Cauſtics and Styptics, you muſt inſert a bit of blue Vitriol, wrapt up in Cotton or Lint, into the upper Orifice of the Artery; ſecuring it there by ſeveral ſmall Compreſſes, each a little larger than the other, and filling up the reſt of the Space on all Sides with rude Bundles of Lint. You muſt then make a ſtrict Bandage, after preſſing it cloſe with the Fingers and Thumb of your Left Hand, over the affected Artery of the diſordered Arm. Inſtead of intruding a Piece of Vitriol into the Orifice of the Artery, you may apply a Doſſil of Lint dipped in, and expreſſed out of the Styptic Liquor of WEBERUS, or in Butter of Antimony: The Effect of which, being ſecured with Compreſſes and Lint as before, will be equal to, if not better than the firſt we propoſed. Over the Dreſſings muſt be applied a ſquare Plaſter, and a large Compreſs of the ſame Form, to be cloſely retained by a Bandage, three or four Times as long as is commonly uſed for Phlebotomy in the Arm. M. DIONIS makes his Deligation without the Piece of Vitriol, for which he ſubſtitutes a Lump or two of chewed Paper, or Lint, dipt in ſome Styptic, which he covers with ſeveral ſmall Compreſſes, each larger than the other, and ſecures the whole upon the inciſed Artery by Deligation: Which Method of dreſſing may, in many Caſes, be convenient and proper enough.

First Method of Operating.

XII. But in order the more effectually to prevent a future Hæmorrhage, it will be neceſſary to apply another Bandage over the former: And, after making ſome circular Rounds with it upon the Part affected, it is to aſcend up the Arm upon the long Compreſs impoſed on the brachial Artery on the Inſide of the Arm, as we directed in the preceding Chapter. That this laſt Bandage may adhere more firmly, it will be neceſſary to paſs it round the *Thorax*, when arrived to the Shoulder, and to faſten it off upon the Arm, diſpoſing the Patient to reſt. When your Dreſſings are thus compleated, and the Tourniquet a little looſened, you muſt obſerve whether any Blood iſſue through the Bandage:

Treatment after Deligation.

dage: And if there be no Appearance of any, it is a Sign your Operation is well performed.

Procedure in Case of an Hæmorrhage.

XIII. But if you perceive any Blood ooze through the Dreſſings, the Artery muſt be again compreſſed by the Tourniquet, your Dreſſings taken off, and re-applied with more Care and Exactneſs: Or elſe a more certain Method muſt be taken to ſecure the End of the Artery, by Ligature, with a crooked Needle and a double waxed Thread, which is the only infallible Means of defending the Patient from a fatal Hæmorrhage, and was formerly propoſed by PAULUS ÆGINETA[a], one of the moſt antient among the *Greek* Phyſicians. But in making this Ligature, the Surgeon muſt have a principal Regard to two Things: He muſt avoid injuring both the Artery itſelf and the adjacent Nerve. In order to which, it will be moſt convenient to make your external Inciſion through the Integuments ſufficiently large, and then carefully to ſeparate the Nerve from the Artery, to which it is attached, by a ſmall Hook: And then to paſs the Head, or obtuſe End of the Needle, foremoſt under the Artery, till you can take hold of the Thread, that its Point may not hurt either that Veſſel or the Nerve. Or elſe, inſtead of a Needle, you may paſs your Ligature under the Artery, by the Inſtrument which I contrived for that Purpoſe in *Tab.* VIII. *Fig.* 4. C. This Inſtrument is to be withdrawn when your Ligature is opened and drawn a ſufficient Length from under the Artery, which is then to be tied with it upon a thin Compreſs of ſcraped Lint, with which you are to defend or inveſt the Artery before the Conſtriction of your Ligature. The Artery being thus ſecurely tied up, you leave about a Hand's Breadth of the Thread or Ligature hanging out of the Wound: In which Manner it is to continue till the Artery is cloſed, and the Ligature comes off ſpontaneouſly. There are ſome Surgeons who alſo direct the lower Orifice of the inciſed Artery to be ſecured by a Ligature as well as the Upper: And there are others again who think the ſame to be uſeleſs, or even miſchievous, as indeed it may be, when the Diſorder being in the Flexure of the Arm, the larger Inciſion and Cicatrix this Way made, will, in ſome Meaſure, impede or ſtiffen the Motion of the Joint. But if the Aneuriſm be not in the Joint, or in the lower Part of the *Cubitus*, and you perceive Blood to iſſue from the lower Orifice of the divided Artery, then you may, and even ought to make a ſecond Ligature below, as well as above. And thus, after I had tied the upper Orifice in an Aneuriſm of the cubital Artery, upon relaxing the Tourniquet, I perceived Blood ſtart from the lower Orifice, which I therefore ſecured like the other, by tying it with a crooked Needle and ſtrong Thread: So that by their Aſſiſtance, with the Application of Balſams, I happily cured the Patient, though a little before in very great Danger of Death. In the ſame Manner you muſt alſo make a Ligature both above and below, even in the Flexure of the *Cubitus*, if you thus find it neceſſary; or at leaſt you muſt compreſs the lower Orifice of the Artery by a proper Bandage and Compreſſes: in which Method I once accompliſhed

[a] *Lib.* VI. *de Re Medica, Cap.* XXXVII. where he ſays, If a Tumor or Aneuriſm is formed from an Injury of the Artery, we make a longitudinal Inciſion through the Integuments: And dilating the Lips of the Wound by Hooks, we denudate the Artery, under which we paſs a Needle and double Thread, tying it above and below. The intervening Part of the Artery betwixt the Ligatures we lay open by Inciſion, and after diſcharging the Contents, we ſuppurate till the Ligatures are digeſted off.

my

my Cure of this Diſorder, without making a Ligature below. When the Artery has been thus ſecured by Ligatures, it is a common Practice with ſome Surgeons to divide it tranſverſely a little beneath the Ligature; that the contracting or receding of the Artery into the Fleſh may compreſs its Extremities, and the better prevent a conſequent or dangerous Hæmorrhage. But in my Opinion that Practice is improper, or at leaſt it is unneceſſary; as I have twice ſucceſsfully performed this Operation, and happily cured the Patients of their Aneuriſms without thus dividing the Artery. Laſtly, you are to fill the Wound well with ſcraped Lint, to be firmly ſecured by Compreſſes and a ſtrict Bandage, as we before directed, and as we ſhall more largely explain and demonſtrate in our third and laſt Part of Surgery or Bandages.

Method of preventing an Inflammation.

XIV. In the next Place it is a common and no improper Practice with ſome Surgeons to guard againſt an Inflammation by laying Linen Compreſſes dipped in Oxycrate, on each Side the affected Parts of the Arm, to be retained by a ſpiral Bandage; and then to bleed the Patient in another Part: Which may be very neceſſary Precautions in Patients of a warm and full Habit. But Phlebotomy with thoſe cooling Applications will be pernicious in ſuch as are of a cold Conſtitution, and have before loſt much Blood in the Operation or otherwiſe; notwithſtanding the *French* recommend that Treatment to be generally followed without any Reſtriction. For I have myſelf cured ſeveral in which I not only omitted Bleeding and the Oxycrate, but even uſed warm Applications of *Sp. Vini Calid. Camphorat. cum Theriaca.* Your Deligation or Dreſſing being thus compleated, the Patient is to be put to Bed, and his Arm laid in an eaſy or a little inflected Poſture upon a Pillow, and the Patient is to be ordered at the ſame time to move himſelf as little as poſſible, in order to reſtrain the Impulſe of the Blood from the Heart on the affected Artery. If you ſhould perceive the Arm to ſwell violently, and threaten an Inflammation, leſt it ſhould be occaſioned by too great a Stricture of your Bandage, you muſt take it off and apply it again as we directed at *N.* XII. preceding. But for a ſmall Tumor or other ſlight Symptoms you ſhould not haſtily remove your Bandage, for fear of a profuſe Hæmorrhage: Eſpecially as Experience teaches that even a livid Swelling of the Arm may be ſuſtained in theſe Caſes without any bad Conſequence, provided the Swelling be not over painful or tenſe, nor infeſted with any of the Symptoms of a Gangrene: Under which Circumſtances we have directed you to a Method in the preceding Chapter.

How to prevent an Hæmorrhage.

XV. But in order to prevent a fatal Hæmorrhage, when the Cure of an Aneuriſm is attempted by Aſtringents or Cauſtics only, without making a Ligature on the Artery, it may be proper for an Aſſiſtant conſtantly to attend and lie by the Patient, provided with a Tourniquet and the Method of applying it to compreſs the Artery in Caſe of ſuch an Accident, till the Surgeon can be called to make a Ligature on the Veſſel by a crooked Needle and double Thread. But ſuch an Accident is, in my Opinion, beſt prevented at firſt by taking up the End of the inciſed Artery with a Needle and Thread, rather than to truſt to the Uncertainty of a Conſtriction or Eſchar made by Cauſtics. 'Tis alſo a prudent Practice of ſome Surgeons to arm their Needle with three Threads; which being paſſed under the Artery, two of them are tied and the other left looſe to be faſtened afterwards by itſelf when the other Threads are relaxed, ſo as to permit a freſh Hæmorrhage.

XVI. With

Management of the Dreſſings.

XVI. With regard to the Bandage and Dreſſings, if they adhere firmly upon the Parts, they ought not to be removed on any ſlight Occaſion, before the third or fourth Day; except a great Inflammation, Tumor, or Hæmorrhage ſhould make it neceſſary to renew the ſame. Then the Surgeon muſt take Care that the Tourniquet be duly applied and fixed upon the Arm, or elſe the Artery ompreſſed by the Fingers of an Aſſiſtant before he proceeds to take off the Bandage and Dreſſings: And even then he ought not violently to force off the Compreſſes if they adhere, which might bring on a profuſe Hæmorrhage; rather let them remain. When he has cleanſed the Wound as much as poſſible, he ſhould fill it with freſh Lint ſaturated with ſome digeſtive Ointment, leaving ſuch Parts as adhere to be ſpontaneouſly ſeparated, in the ſucceeding Dreſſings. In this Diſorder the Dreſſings ought to be repeated as ſeldom as poſſible, eſpecially within the firſt fifteen Days; and then it ſhould be made with all the neceſſary Cautions to prevent a Rupture of the Artery and a profuſe Hæmorrhage.

Treatment of Inflammatory Heats, Fevers, and other Symptoms.

XVII. If within a few Days after the Operation the Patient is ſeized with an Inflammation or Fever, from the intenſe Heat and increaſed Motion of the Blood, Threatning an Hæmorrhage or a Gangrene in the affected Arm, he muſt then be inſtantly bled in the other Arm. In the mean time a cooling Regimen and Medicines are to be uſed, and Phlebotomy again repeated in Proportion to the Patient's Habit and the Urgency of the Symptoms. The Diet ſhould be light, ſpare, and cooling, conſiſting chiefly of ſmall Broths and diluent Suppings; induſtriouſly avoiding all hard and ſtimulating or heating Food, as is uſual in large Wounds and other Inflammations.

Agglutination of the Wound.

XVIII. When the Orifice of the Artery is cloſely conſolidated or united, which in common Aneuriſms uſually ſucceeds in ten Days or a Fortnight's Time, your Buſineſs is then to agglutinate or heal up the external Wound in the Integuments, by treating it either with dry Lint or vulnerary Balſams: Obſerving in the mean time to make the Patient gently bend and extend his Arm at Intervals. Without this Precaution he may be troubled with an obſtinate Rigidity or Stiffneſs of the Joint and an Incurvation of the Arm: Partly for want of attenuating and diſperſing the Synovia, or Mucilage of the Joint, by repeated Motions; and partly from not ſtretching or extending the Cicatrix as it becomes gradually formed and more indurated.

PURMAN's Method of operating.

XIX. Another Method for curing Aneuriſms is, by fixing the Tournequet on the Arm, as we before directed: Then making an Inciſion through the Integuments, without touching the Aneuriſm, and having freed the diſordered Artery from its Adheſions to the adjacent Nerves, it is then elevated by a Hook ſufficient to paſs a crooked and obtuſe-pointed Needle under it, or our Inſtrument, *Tab.* VIII. *Fig.* 4. armed with a double-waxed Thread. By the tying of which Thread the Artery is conſtringed or cloſed; but in ſuch a Manner that you muſt always place a ſmall Compreſs of Lint upon the Artery under the Knot, leſt it ſhould cut or break through the Coats of that Veſſel. The Artery being thus tied above and below the Aneuriſm, the Tumor is next laid open by Inciſion betwixt the two Ligatures, its Contents diſcharged, and the Wound then treated as we before directed in *N.* XVI. *& ſeq.* And this laſt is the Method PURMANNUS followed in the Cure of that large Aneuriſm which he mentions, *p.* 212. of his *Chirurgia curioſa*, compleating the Cure, and healing up the Wound within the Space of a Month. We have given the Figure of this monſtrous large Aneuriſm in *Tab.* IX. *Fig.* 6. partly for its Uncommonneſs, and to illuſtrate

illuſtrate the Nature of the Diſorder; and partly to refute the Opinion of GOVEIUS[a], *viz.* That a true Aneuriſm never exceeds the Size of a Cheſnut.

XX. The third and laſt Method of performing the Operation for the true Aneuriſm, is, by returning or preſſing back the Blood out of the Aneuriſm into its correſponding Artery (which in large Aneuriſms, where the Blood is very much concreted, is a thing impracticable[b]) where this can be effected, the Tourniquet is applied to the Arm, and a longitudinal Inciſion made through the Integuments as before, without at all injuring the Aneuriſm itſelf by the Scalpel. This done, and the Artery freed from its Adheſions to the Nerve and Parts adjacent, it is then compreſſed by Ligature with a Needle and Thread as before; only without making any Inciſion in the Artery afterwards: By which means the Blood is prevented from returning into the Aneuriſm or diſtended Part of the Artery. You are then to treat the Wound with Digeſtives, as before, till the Ligatures and morbid Part of the Artery are caſt off ſpontaneouſly; after which you may heal and cicatrize as we before directed. This is the Method by which ANELIUS[c] happily cured a very dangerous Aneuriſm within the Space of a Month, at *Rome*. This he prefers, as one may hereby avoid the making a large Wound and Cicatrix, which are the conſtant Attendants of opening the Aneuriſm by Inciſion, and diſcharging its contained Blood, either by the Fingers or Inſtruments, which greatly protracts the Cure of the Diſorder, as well as renders it more painful, and attended with a diſagreeable and uneaſy Scar. After the Operation is performed as above, ANELIUS bled the Patient four Times in the oppoſite Arm; and indeed repeated Phlebotomy is recommended by all the other *French* Surgeons who have treated on this Diſorder. But though ſuch repeated Bleeding may be of great Service in abating the Motion and *Impetus* of the Blood, in their warm Climate and Conſtitutions: Yet, in our more northern or colder Countries or Conſtitutions, I think it may be very well omitted; as it would too much weaken the Patient, and as I have happily cured ſeveral Aneuriſms without it.

A third Method by ANELIUS.

XXI. If, as I have ſometimes obſerved, the Coats of the true Aneuriſm ſhould burſt ſpontaneouſly, ſo as to extravaſate the Blood, it then degenerates into a ſpurious Aneuriſm, for which there is no Cure but by the Knife. Here therefore you muſt firſt of all apply the Tourniquet to compreſs the Artery and prevent an Hæmorrhage; you muſt then make an Inciſion through the Integuments ſufficient to diſcharge what concreted Blood may have been extravaſated and intercepted. Which done, and the Wound well cleanſed, you muſt ſecure the Artery with a Needle and Thread, as in the true Aneuriſm; dreſſing and healing up the Wound as we have before largely directed.

Treatment of the ſpurious Aneuriſm.

XXII. Whenever you meet with the brachial, cubital, or tibial Artery, wounded either by a Dart, Sword, or other Inſtrument, ſo that the Hæmorrhage thence proceeding cannot be ſuppreſſed, either by Bandage or Remedies, there is then no Method of ſaving the Patient ſo certain and expeditious as this here propoſed for Aneuriſms. You ought firſt to apply the Tourniquet, then denudate the Artery; and, if it be very ſmall, to treat it with Cauſtics or Aſtrin-

The Ligation of other Arteries in the ſame Manner.

[a] See his *Chirurg.* pag. 23. 1.

[b] And therefore when the Blood cannot be returned out of the Aneuriſm, this Method will not ſucceed, but one of the former muſt be uſed.

[c] See ANELIUS's *Suite de la nouvelle Methode de guerir les Fiſtules lacrimales*, pag. 257.

gents: But if large, to ſecure it by Ligature with a Needle and Thread, as we before directed. For I may, without boaſting, declare, many are the Patients that have, with my own Hand, been by this means as it were ſnatched from the Jaws of Death. I have even recovered thoſe by Ligature, who have been almoſt ſpent and exhauſted, ſo as to look like Death, through the fruitleſs Attempts of the Surgeons, continued for ten or twelve Days together by Styptics and tight Bandage, which had occaſioned their Limbs to ſwell to an enormous Size. But whether or no this Method will ſucceed ſo as to ſave the Limb, in Wounds of the large crural Artery, I have never yet had an Opportunity of experiencing, nor did I ever hear or read of it attempted by others.

Aneuriſms in the Head, Hands, and Feet.

XXIII. In the Method we have here preſcribed, you ought alſo to treat other Aneuriſms, when they are curable: Which may be determined, partly from conſidering the Size and Situation of the Artery, and partly from the Size and Nature of the Aneuriſm itſelf. But, for the Sake of Beginners, I ſhall be a little more particular in my Account of other Aneuriſms, and the rather, becauſe it is a Subject of which moſt of our modern Surgeons take little or no Notice. And firſt, an Aneuriſm of the Artery betwixt the Thumb and Fore-finger, occaſioned by a Puncture from a Penknife, was cured by Compreſſion, as we are told by TULPIUS (*Lib.* IV. *Obſ.* 17.) Which Compreſſion he made by applying firſt, an aſtringent Plaſter, over that a Plate of Lead, and then by a ſtrict Bandage, having firſt returned the Blood out of the Tumor; the Diſorder was cured within the Space of four Months. The ſame Treatment of Compreſſion may be therefore uſed in moſt other Aneuriſms, eſpecially thoſe which are recent, and not large, after having firſt returned or diſcharged the Blood contained in the Aneuriſm. A Woman ſtruck her Son, of ſeven Years old, ſuch a Blow on the Left Side of the Head with a Stick, that, by contuſing the carotid Artery, a throbbing Tumor was inſtantly formed, about the Size of a Hazle Nut; which, in the Space of eight Days Time, grew ſo large as to cover half of his Head, from the ſagittal Suture all over the Temple and Forehead to the Eye. Upon her coming for Advice, it was thought proper by the Surgeons to prefer the Operation, though a doubtleſs Remedy, rather than leave the Patient to the more certain Hazard of his Life. The Tumor was therefore laid open by the Scalpel, the contained Blood diſcharged, and the Wound dreſſed with Aſtringents and tight Bandage: By which means the Patient recovered in a ſhort Time[a]. Thus alſo was cured an Aneuriſm of the Artery behind the Ear, in Proceſs of Time, though with much Difficulty, by the Uſe of Aſtringents and tight Bandage[b]. If an Aneuriſm ſhould ariſe near the Ancle, like that deſcribed by RUYSCH, *Obſ.* XXXVIII. which was opened by an imprudent Operator for an Abſceſs, you ought either to make an Inciſion through the Integuments and Tumor, and to apply Aſtringents with a tight Bandage; or elſe to denudate the Artery, and ſecure it by Ligature with a Neelde and Thread, as we directed before. Hence you may be alſo able to treat Aneuriſms formed in any of the other acceſſible Arteries of the Body, where there is any Proſpect of obtaining a Cure. HARDERUS *Apiar. Obſ.* p. 325. takes Notice of a Patient's ſudden Death, from opening an Aneuriſm of a carotid Artery in the Neck: And

[a] See BARTHOLIN. *Epiſt. Med.* 53. Cent. III.
[b] *Ephemer. Nat. Curioſ.* Cent. III. Obſ. LXVI. pag. 150.

VAN

VAN HORN has obſerved the ſame from an Apertion of an Aneuriſm in the Thigh. *Vid. Epiſt. de Aneuriſmate.*

XXIV. They who deſire a better Idea of the Manner in which the Ligatures are to be made upon the Artery for an Aneuriſm, may inſpect *Fig.* 7. in our ninth Table, where A denotes that Part of the Artery above the Aneuriſm, B the Part below, C the Aneuriſm itſelf, D the ſuperior Ligature, and E the inferior one. But here we may again obſerve, that when the Tumor is on the Flexure of the Arm, the lower Part of the Artery ſhould not be tied with a Ligature, except it be abſolutely neceſſary, for the Reaſons we before alledged. But in what Manner the Circulation of the Blood is carried on through the Hand and lower Parts, after the Operation, I cannot conceive, eſpecially when there is but one Trunk * of the brachial Artery near the Elbow; as muſt have been the Caſe with the Patient of ANELIUS, becauſe no Blood returned by the lower Part of the Artery, after its Diviſion, into the Tumor, notwithſtanding he did not ſecure it by Ligature. We muſt therefore defer our Inquiry on this Head, till ſome body may have an Opportunity of examining the Arm of a dead Subject who has undergone this Operation in his Life-time. Dr. WALTER HARRIS, in his Eighth Chirurgical Diſſertation, openly condemns this Operation, and calls it dreadful and raſh Butchery: But for what Reaſons himſelf beſt knows. He ſeems, in my Opinion, to have been a very timorous Phyſician, who, out of Fear, or a fooliſh and ill-grounded Compaſſion, is for rejecting ſome of the moſt conſiderable and uſeful Operations in Surgery: Without which, it will be impoſſible for the Patient to obtain a Cure, or even to ſurvive any Time.

Some Obſervations on the Diſorder.

CHAP. XIV.

Of injecting Liquors into the VEINS, *and of transfuſing the* Blood *of one Animal into another.*

I. WE treat next of *Injecting* and *Transfuſing*, as a Branch of Surgery: Becauſe thoſe Operations require the Apertion of a Vein, in the ſame Manner as in Bleeding. The firſt is, the injecting ſome Liquor or Medicine into a Vein opened by Inciſion: And the laſt is, the conveying the arterial Blood of one Man, or Animal, into the Veins of another. Notwithſtanding theſe Operations are ſeldom practiſed by our modern Surgeons, yet they were highly celebrated, and often performed, in the laſt Century, from the Year 1660 to 1680: And therefore we ſhall not think much of our Endeavours here, to give the young Surgeon a clear Notion of the Affair, from whence he may alſo be able to underſtand what Reaſons gave Occaſion for the firſt Invention and Perfor-

The Operations deſcribed.

* I have often found two Trunks, or large Branches of this Artery, one ſituated in the inward, and one in the outward Part of the Arm; which below the Flexure of the *Cubitus* communicated again. But moſt Anatomiſts have deſcribed one only.——See my Diſſertation on a dangerous Wound of the crural Artery.——Many Surgeons, unacquainted with this Particular in Anatomy, have taken off the Patient's Arm, where there was no Occaſion, and often endangered his Life.

mance thereof; and what Advantages may be perhaps reaſonably expected from the ſame Operations, even at this Time.

Uſes expected from them.

II. The Generality of Phyſicians, not without Reaſon, attribute moſt Diſorders of the Body to ſome Vice in the Blood. Therefore what Method can be more ready to remove or correct that Vice, than injecting a proper Medicine into the Veins to mix with the Blood itſelf, or the transfuſing the ſound Blood of one Man or Animal into the Veins of another, inſtead of that which is diſeaſed. For by this means the Action of a Medicine on the Blood will be immediate and entire, without being impaired or changed by paſſing the Stomach and Inteſtines, and mixing with various Juices before it arrives to the Veins. But there are even many Caſes which occur, wherein no Medicine at all can be taken by the Mouth, as in Apoplexies, Anginas, the *Hydrophobia*, *&c.* which may poſſibly be this way remedied, when they cannot by any other. And if plentiful Bleeding is ſo ſerviceable in many Diſorders, as the Leproſy, Gout, Epilepſy, Apoplexy, Conſumptions, Scorbutus, Venereal Diſeaſe, malignant Fevers, *&c.* by diſcharging the peccant Matter in the Blood, as it is by many Phyſicians allowed: Even the Objections of other Phyſicians againſt it, as weakening the Patient, *&c.* may, by theſe Operations, be obviated or removed. Even old Age may be ſupported, and the very worſt Habits of Body corrected by theſe Means, ſo as to give a firm, juvenile, and healthy Conſtitution. Theſe, and ſuch like, are the vaſt Expectations which have been formed from the preſent Operations by Phyſicians: But the Misfortune is, that they not only meet with Diſappointment in their good Views, but even frequently the Event turns out worſe than the Diſeaſe. For almoſt all the Patients who have been this way treated, have degenerated into a Stupidity, Fooliſhneſs, or a raving or melancholy Madneſs, or elſe have been taken off with a ſudden Death, either in or not long after the Operations. Theſe lamentable and fatal Conſequences have brought the Art of Injections and Transfuſions into Neglect at the preſent: So that, being ſuſpected and condemned by proper Judges at *Paris*, where they moſt flouriſhed, we are told they were in a little Time prohibited by a public Edict of that Parliament.

The Art of Injection deſcribed.

III. Notwithſtanding this, we ſhall give the young Surgeon an Idea of the Manner in which Liquors were formerly, and may now be injected into the Veins of living Men, or other Animals. And firſt, a Vein is to be opened, uſually in the Arm, by your Lancet, as in Bleeding: And having introduced the ſmall Pipe of a Syringe, or a very ſmall Clyſter-pipe with a Bladder (*Tab.* XI. *Fig.* 10.) the contained Liquor is injected or forced into the Vein upwards towards the Heart. Which done, you are to dreſs the Orifice, and make your Deligation upon the Arm in the ſame Manner as after Phlebotomy. But whether or no this Method of injecting proper Medicines into the Blood may ſucceed, eſpecially in deſperate Apoplexies, Anginas, *Hydrophobia*, *&c.* and whether it may not be often uſeful to diſcharge the morbid Blood, and transfuſe ſuch as is ſound, or warm Milk or Broth in its ſtead, ought, in my Opinion, to be determined by future and repeated Experiment. PURMANNUS, in his *Surgery*, (*Part* III. *Cap.* 31.) tell us, that he has not only performed the Operation with Succeſs on others, but alſo very happily upon himſelf, being by this means cured, not only of a troubleſome Itch, but alſo of a ſtubborn Fever. A profeſſed Treatiſe on the Subject has been publiſhed by ELSHOLTZ, intitled, *Clyſmatica*

tica Nova, ſive Chirurgia infuſiora & transfuſiora, 8vo. 1667. *Editio ſecunda, cum Fig.*

IV. For the Transfuſion of Blood into the Veins, you are firſt to open a Vein in the Patient's Arm or Hand, as at *Fig.* 11 and 12. *Tab.* XI. and then thruſt gently upward into it a ſmall Tube of Silver, Braſs or Ivory. The ſame is to be alſo done with the ſound Perſon; only the Tube muſt here be inſerted downward towards the ſmall End of the Vein. This done, the ſmalleſt of the Tubes is to be inſerted into the other larger one, by which means as much Blood will paſs from the ſound Perſon into the Patient as may be thought proper, and then the inciſed Veins are to be dreſſed or bound up as in Bleeding. But if the Patient does not recover after one Transfuſion, the Operation ſhould be repeated again at convenient Intervals. But before the Patient receives the Blood of the ſound Perſon, he ought to be bled proportionably, that the new Blood, laſt received, may have the freer Circulation. Sometimes a Vein is opened in each Arm of the Patient at the ſame Time, that as much of the vitiated Blood may flow out of one Orifice as he receives of the ſound by the other. For more on this Subject, among others, the Reader may conſult LAMZWARD *in Notis ad* SCULTETUM, and JUNGKEN *Chirurg. Germanica*, pag. 487. where you have Figures of the Operation. If the Blood is to be transfuſed out of ſome Animal into the Patient, then a Calf or a Lamb, for Example, are to be ſecured by Ligatures, and one of their Veins or Arteries opened, either in the Neck, Leg, or Thigh; and the reſt of the Operation managed as before. See *Tab.* XI. *Fig.* 13. and LAMZWARD *in Append. ad* SCULTETI *Armament. Chirurg.* and BURMANNI *Chirurg. P.* III. *Cap.* 31. Laſtly, where Tubes of Metal or Bone were found painful and leſs convenient, for want of being flexible, Operators contrived to faſten an intermediate flexible Pipe betwixt the two others, ſuch as Part of the carotid Artery, or of the Ureter from an Ox, Calf, or Lamb, or the Wind-pipe of a Capon, Duck, &c. by which means the Proceſs becomes much facilitated both to the Operator and Patients.

The Method of Transfuſion.

V. The Contrivance of this Artifice, by which the Blood of one Animal is transfuſed into the Veins of another, is aſſumed by Dr. LOWER, in his Treatiſe *De Corde*, in oppoſition to M. DENIS, who, in his *French* Epiſtle upon this Subject, claims the Invention to himſelf. It is true, the latter made many Experiments in this Way at *Paris*, but with very bad Succeſs. STURMIUS, once a celebrated Profeſſor of the Mathematics at *Altorf*, and VERHIUS, Profeſſor at *Francfort*, attribute the Invention to MAURIT. HOFFMAN: Whereas MUYS aſſerts, that LIBAVIUS deſcribed the Proceſs at large in the Year 1615, but without telling us the Book. The firſt Injection of Liquors into the Veins of Animals is generally attributed to the celebrated Sir CHRIST. WREN; but I think we have this Artifice deſcribed before him, by a Profeſſor of Phyſic, in a Treatiſe publiſhed *An.* 1664, in which he explains the Proceſs that had never before been heard of in *Germany*. They who deſire more on this Subject may conſult MAJORIS *Lib. de Chirurgia infuſoria*, ETMULLER *Diſputat. in eod. Argumenta conſcript.* ELTSHOLTZ *Clyſmatica nova*, PURMANNUS *Chirurgia*, LOWER *De Corde*, SANTINELLUS *in Confuſione Transfuſionis*, MANFREDUS *De Sanguinis Transfuſione*, STURMIUS *in Philoſophia Eclect. Diſſ.* X. MERCKLINUS *De Ortu & Occaſu Transfuſionis Sanguinis*, LAMZWARD *in Appendice ad* SCULTETUM, pag. 29.

The Invention of this Art.

For Injections into the Veins in desperate Diseases, See *Misc. Nat. Cur. Ann.* IX. and X. *pag.* 144. and LOWTHORP *Phil. Transact. Abr.* Vol. III. page 226 to 235.

An EXPLANATION *of the* ELEVENTH PLATE.

Fig. 1. Represents an Arm in which a Vein is to be opened: A denotes the Cephalic Vein, B the Basilic, and C the Median Vein; D the Ligature fixed above the Elbow to make the Vein swell.

Fig. 2. Represents the several Forms of inciſing a Vein with the Lancet: A shews a longitudinal Inciſion, B a traſverſe one, and C, D, oblique ones.

Fig. 3. Exhibits the antient *German* Phlebotomus or Fleam for opening a Vein, A the sharp Point to be fixed on the Vein, B the Handle to be held in one Hand, while the Part C is struck by a Fillip of the Finger of the other Hand, so as to drive the Point A into the Vein.

Fig. 4. Is a Spring-Fleam, now in Uſe with some. The Part A being fixed on the Vein, and the Part C being elevated, depreſſes the Spring by the End B, which by its Reaction or Elaſticity ſtrikes the End C upon the Fleam A, ſo as to drive it into the Vein. DD is a hollow Caſe of Braſs or Silver, in which the Spring-Part of the Inſtrument B is included.

Fig. 5. Represents the *French* Phlebotomus or Lancet, bent so as to form an obtuſe Angle, as it ſhould be, for the more convenient holding it in Bleeding.

Fig. 6. Is the great Aneuriſm, as big as one's Head, obſerved by PURMANNUS in an Arm near the Joint or Bend of it.

Fig. 7. Shews the Manner of applying the Ligatures above and below an Aneuriſm, in the Operation for that Diſorder. A B the Artery, C the Aneuriſm, D the Upper Ligature, E the Lower Ligature.

Fig. 8. Exhibits an Inſtrument contrived both for the Prevention and Cure of Aneuriſms. A A A denote the Plate of Iron or Steel adapted in Form to the Flexure of the Arm, B its Fiſſure, CC Ligatures faſtened to the Ends A A, and extended to D D. E denotes a moveable Steel Plate, joined by the Hinge I, and covered with a Cuſhion of Cotton or Silk at F, to be fixed upon the Aneuriſm, G G are two ſmall Hooks by which the Inſtrument is faſtened upon the Arm by the Ligatures C C D D, H is a Screw by which the Plate and Cuſhion E F are preſſed down upon the Tumor.

Fig. 9. Represents an Inſtrument of the ſame Kind with the former, but of a different Shape. Here the Plate and Cuſhion E F are larger, for bigger Aneuriſms than the former. Its Parts and Explanatory Letters correſpond to thoſe of the preceding Figure.

Fig. 10. Shews the Apparatus with a Bladder and Tube for Injection of Liquors into the Veins: A the Bladder and Tube, B a Vein of the Arm opened, in which the Tube is inſerted.

Fig. 11 and 12 Exhibit the Transfuſion of the Blood from the Veins of one Man into thoſe of another: B denotes the recipient, and A the remittent Arm.

Fig. 13. Shews the Transfuſion of Blood from the crural Artery or Vein of an Animal into the Arm of a Man by the Intervention of the Tube A.

CHAP.

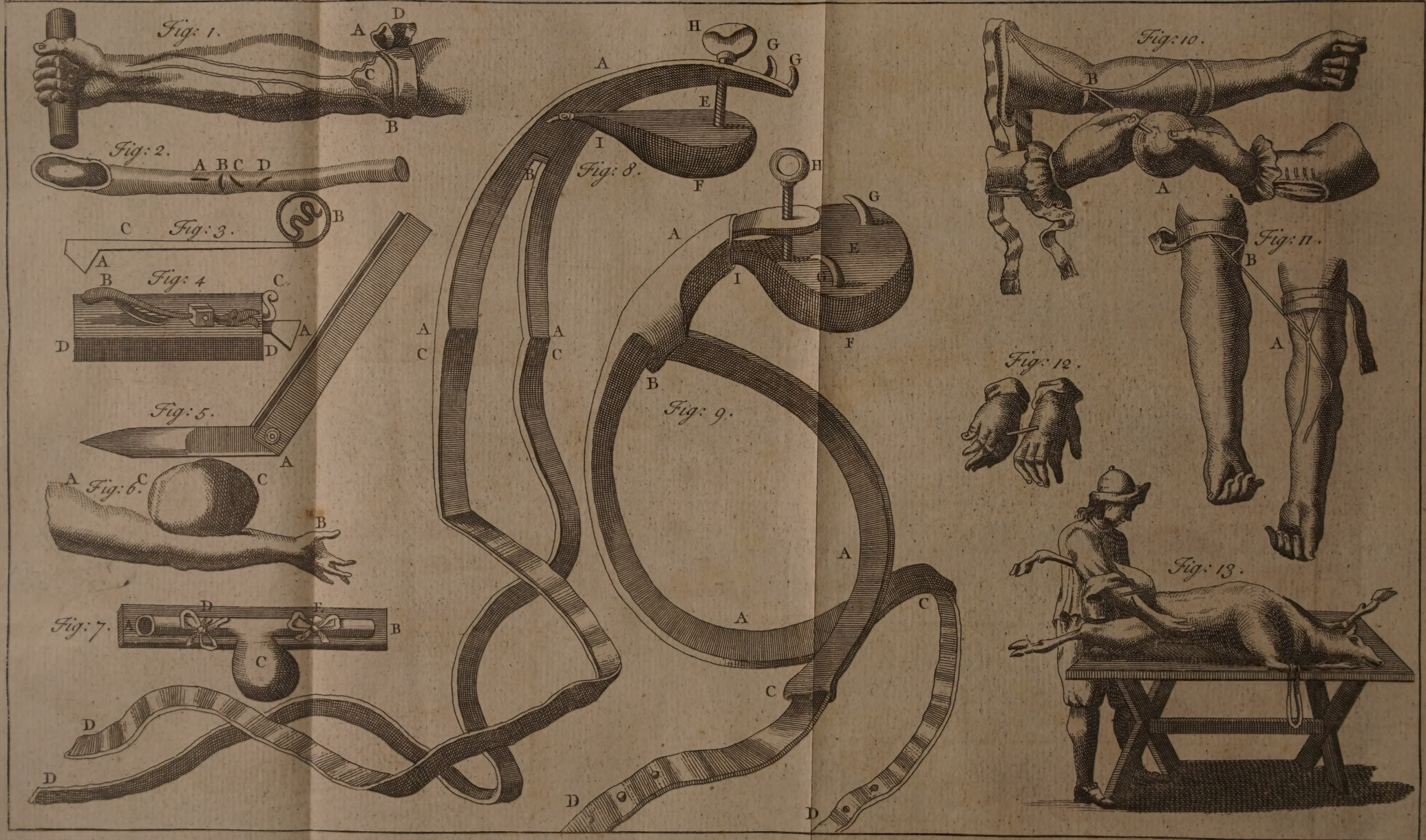
Fig: 1.
A
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Fig: 2.
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E
I
F
A
A
C
C
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Fig: 9.
A
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Fig: 10.
B
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Fig: 11.
B
A
Fig: 12.
Fig: 13.

CHAP. XV.

Of INOCULATION *for the* SMALL POX.

I. THE Art of ingrafting or propagating the Small Pox by Inciſion or Inoculation, has been an Operation equally famous in all Nations with thoſe in the preceding Chapter. Therefore we ſhall, for the Sake of Beginners, deſcribe the Proceſs of it, which under proper Circumſtances may be of great Service to Mankind. The Deſign of this Chapter.

II. The Deſign of this Operation is, to communicate, by Art, a milder Species of the Small Pox to the Infant or adult Patient, than that received by the natural Infection: and this by ingrafting ſome of the variolous Matter. In order to which a ſmall Inciſion [a] is to be firſt made with a Scalpel or Lancet through the Skin of the Arm, and having inſerted a ſmall Particle of the purulent Matter taken from a mild Kind of the Pock, the little Wound is then to be dreſſed with ſome dry Lint, and covered with a Plaſter. After the Operation, the Patient muſt conſtantly keep to his Chamber, the Air of which ſhould be moderately warm, and his Diet regulated by ſome prudent Phyſician, by which means the Diſorder will ſhew itſelf in about ſeven or eight Days, without any malignant Symptoms: And, if aſſiſted by a proper Regimen and moderate Warmth, it uſually runs gently through its ſeveral Stages. When the Patient has once had the Diſorder this Way, though never ſo mild, we are aſſured by Experience, that they never have it again: And therefore the Opinion of thoſe ſeems to be well grounded who think the Propagation of the Small Pox by Inoculation might be of general Uſe and Benefit to Mankind, in preſerving the Lives of ſome, and the moſt important Members of others, as the Face, Eyes, Hearing, Viſcera, *&c.* Inoculation deſcribed.

III. Hiſtory informs us, that the Diſorder was this way propagated many hundred Years ago among the *Greeks* and *Turks:* Whereas it is but of late Years that the *European* Nations have come into it; among which the *Engliſh* ſeem to have approved and followed it moſt. The Experiment ſucceeded ſo well in the Hands of the *Britiſh* Phyſicians, that the late King *George* himſelf countenanced the ſame in all his Dominions: And from thence the Practice prevailed with Succeſs in *Germany*, particularly at *Hanover*, *Onolſbac*, and *Pyrmont*. The Operation practiſed by other Nations.

IV. It muſt, however, be confeſſed, that there were many, both among the *French* and *Engliſh*, who endeavoured to ſuppreſs and vilify this Practice in their public Libels, condemning it as fatal to Mankind, and unfit to be encouraged among a Chriſtian People; but, I think, all they have objected or advanced has been long ago ſufficiently anſwered and obviated by the learned Dr. JURIN, and other able Phyſicians. They who deſire more particular Accounts, may conſult the Diſſertations publiſhed by the celebrated Phyſician laſt mentioned, as alſo thoſe by PYLARINUS of *Italy*, the celebrated VATERUS of *Vitemberg*. *Act. Erud. Lipſ. Ann.* 1723, 1725. *Act. Natur. Curioſ.* Vol. I. *Obſ.* LXXV. *p.* 133, *&c.* And laſtly, they may conſult Experience, the beſt Phyſician of all. The Objectors againſt this Practice.

[a] But Dr. HARRIS, in his *Chirurgical Diſſertations*, directs only the Cuticle to be abraded, and the variolous Matter to be ſpread on the naked Skin.

My own Opinion of it.

V. But, for my own Part, if I may ſpeak freely, I am ſo far from thinking the Practice fatal or miſchievous, that I rather firmly believe it might, under a proper Management, be of the greateſt Uſe and Benefit to the Lives and Healths of Mankind. For, if I think right, the Small Pox ariſes from a peſtilential Virus or Matter lodged in the Blood from the very firſt Day of the Birth, which breaks out almoſt in every Perſon ſooner or later: And the more early, uſually the better. For it is very ſeldom we obſerve the Pock favourable in thoſe more advanced in Years: So that the Matter ſeems to multiply itſelf in the Blood, and augment with the Patient's Age. And this, in my Opinion, is the Reaſon why we oftener meet with the Small Pox more mild and favourable in Infants than Adults. If therefore the Diſorder be procured of a mild Kind by this Operation, and the Blood cleared of its latent Virus, while ſmall in Quantity, and the Infant young, I doubt not but many, and eſpecially the Children of Princes and Nobility, might be thus not only preſerved from Death, but even conducted ſafely through the ſeveral Stages of the Diſeaſe, without the Inſults of its moſt malignant Symptoms. We are convinced by Experience, as well as Reaſon, that the Diſorder which breaks out from a natural Infection is generally more ſevere and fatal than that procured by Art: And no Wonder it ſhould be ſo; ſince in the laſt the Phyſician has an Opportunity of chuſing the moſt favourable Seaſon, and of preparing his Patient beforehand by a proper Regimen, Diet, and Medicines.

CHAP. XVI.

Of SCARIFICATION *and* CUPPING.

The Method of dry Cuping.

I. SCarification and Cupping was an Operation frequently performed by the moſt antient Surgeons and Phyſicians [b], notwithſtanding the Moderns have, by their Pride or Neglect, turned the Buſineſs over to thoſe who attend the Baths or Hot-houſes. Yet, as it makes none of the leaſt Operations in Surgery, we ſhall here briefly conſider and explain the ſame. The Operation of Cupping is indeed vague, and not confined to any particular Member of the Body. But whenever the Cupping-glaſs is applied, it is fixed upon the Skin, either entire or ſcarified: And hence we have a twofold Diſtinction of Cupping into *dry* and *gorey*. The Figure of the Cupping-glaſs, for either of theſe Purpoſes, is repreſented in *Tab.* XII. *Fig.* 1. In dry Cupping, the Glaſs adheres to the Skin by expelling or rarifying its included Air by lighted Flax or the Flame of a burning Candle within it, ſo that the Glaſs is preſſed upon the Part with a conſiderable Force by the external Air; in which Artifice our ordinary Cuppers are ſufficiently well verſed. The Uſe of this dry Cupping is twofold; either to make a *Revulſion* of the Blood from ſome particular Parts affected, or elſe to cauſe a *Derivation* of it into the affected Part upon which the Glaſs is applied. Hence we have a Reaſon why HIPPOCRATES [b] orders a large Cupping-glaſs to be applied under the Breaſts of Women who have a too profuſe Diſcharge of their Menſes, intending thereby to cauſe a Revulſion of the Blood upwards

[a] As we read in HIPPOCRATES, CELSUS, GALEN, *&c.* [b] Sect. V. Aphor. 50.

from

from the Uterus. And upon the ſame Principle I have myſelf ſucceſsfully cured a profuſe Hæmorrhage at the Noſe, and an Hæmorrhage or Spitting of Blood from the Lungs, by applying Cupping-glaſſes to the Legs and Feet, particularly about the Ancles and Knees. SCULTETUS give us a remarkable Inſtance in *Obſ.* 85. of a Woman, who, by the repeated Application of ſix Cupping-glaſſes (without Scarification) to her Thighs, was not only relieved of the troubleſome Symptoms, cauſed by an Obſtruction of her Menſes, but was alſo thereby freed from the Obſtruction itſelf. Dry Cupping is alſo uſed with Succeſs to make a Revulſion by applying the Glaſſes to the Temples, behind the Ears, or to the Neck and Shoulders, for the Removal of Pains, Vertigos, and other Diſorders of the Head. [a] They are alſo applied to the Upper and Lower Limbs to derive Blood and Spirits into them when they are paralytic; and, laſtly, to remove the Sciatica and other Pains of the Joints. [b] The Operation is, in theſe Caſes, to be repeated upon the Part till it looks very red, and becomes painful.

II. But Cupping is much oftener joined with Scarification, than uſed alone with us in *Germany*, and in other northern Countries: In which Caſe, the Part is firſt to be dry cupped till it ſwells and looks red, and the Skin is to be punctured or inciſed by the Scarificator, *Tab.* XII. *Fig.* 2. with which you may make ſixteen or twenty ſmall Wounds in the Skin, cloſe enough to each other to be covered by the Cupping-glaſs, into which the Blood ought to flow from them. (*See Fig.* 3.) In repeating theſe Inciſions, and re-applying the Cupping-glaſs upon freſh Parts of the Skin, the Operator muſt obſerve to begin at the loweſt Part, and thence aſcend gradually, that his Work may not be obſcured by the refluent Blood from above. Having ſcarified the Skin, and applied the Cupping-glaſs with Fire, as before directed, the latter will adhere firmly to the Part, and the Preſſure of the external Air will force a conſiderable Quantity of Blood into it from the Inciſions. But as ſeveral Glaſſes (ſometimes ſix or eight) are often applied at one and the ſame Time, and to different Parts of the Body, the Operator muſt manage his Buſineſs ſo that ſome Glaſſes may be filling, while he is ſcarifying and adapting the others: And in thus ſhifting them alternately, he muſt pour out their Blood into a Pan or Veſſel, waſh them in warm Water, cleanſe the Skin with a Sponge dipped in the ſame Water, and then apply the Glaſſes as before. When the Blood ceaſes to flow faſt enough, you muſt repeat your Inciſions with the Scarificator cloſe by the former, and re-apply your Cupping-glaſſes till a ſufficient Quantity of Blood is drawn, or till it ſtops of its own accord. Your Operation being finiſhed, and the Skin well cleanſed with a Sponge and warm Water, it is next to be rubbed over with a Bit of Deer's Suet to promote the Healing. But if the Blood ſtill continues to flow, which it does but ſeldom, you are then to waſh the Skin with *Sp. Vini*, *Aq. Reg. Hungar.* binding it up with a Compreſs and Bandage.

Cupping with Scarification.

III. The modern Surgeons have, for Conveniency to themſelves and Eaſe to the Patient, contrived a Scarificator, different from the laſt mentioned, which conſiſts of ſixteen ſmall Lancet-blades fixed in a cubical Braſs Box, with a Steel Spring, as at *Fig.* 4. *Tab.* XII. When the Side of this Inſtrument marked CCCC is applied to the Skin, and the included Spring bent by the Lever A, by depreſ-

The modern Scarificator.

[a] See CELSUS, *Lib.* iv. *c.* 2. [b] See DECKER's *Exercit.* p. 34.

preſſing the Button B, it is ſo ſuddenly let looſe as by its Force to ſtrike the Points of the ſixteen Blades out of the Caſe at one Inſtant into the Skin, making as many ſmall Inciſions at once in their regular Order, over which the Cupping-glaſs is to be applied, as we before directed. We meet indeed with the Figure of a Scarificator not much differing from this in PAREY's Surgery, *Book* XI. *Chap.* 5. and after him in LAMSWARD's Notes to the *Armamentarium* of SCULTETUS. But they do not propoſe the Inſtrument for other Uſes than to ſcarify the unſound Parts in an incipient Mortification: Whereas this is uſed with good Succeſs by our Cuppers in many other Diſeaſes, as I myſelf have frequently ſeen and experienced. Though M. GARENGEOT[a] condemns it as a bad and uſeleſs Inſtrument: But perhaps that Gentleman never ſaw the Uſe and Effects of it.

Uſes of Scarification.

IV. Cupping with Scarification is uſed in various Parts of the Body, particularly in the Head, Neck, Shoulders, behind or under the Ears, Occiput, Back, and Loins, Legs and Arms, and near the[b] Ancles: And this for making a Derivation, Revulſion, or Evacuation in the various Diſorders incident to plethoric Habits; ſuch as various inflammatory Diſorders in the Head, Eyes, Ears, Tonſils, and Uvula, particularly violent Head-achs, Ophthalmias, Amauroſes, Suffuſions, *&c.* In all which Caſes it is hardly poſſible to expreſs the general Benefit which may be received from this Operation, eſpecially when timely uſed, and judiciouſly repeated at proper Intervals. Nor is Scarification much leſs beneficial than Phlebotomy in thoſe Patients, whoſe Veins are ſo ſmall or obſcurely ſituated, that it would be dangerous opening them by the Lancet: Yet as it is often abſolutely neceſſary to make a Diſcharge of Blood ſome way from them, I have often adviſed this Method to be followed, and with good Succeſs. The excellent Anatomiſt MORGAGNI[c] adviſes Scarification upon the Occiput in Apoplexies, and all ſoporous Affections, as one of the beſt Remedies that can be recommended, either from Reaſon or Experience: Becauſe in this Way the heſitating Blood may be diſcharged from the obſtructed Veins of the Brain, which communicate with thoſe of the Occiput, or at leaſt it may, by this means, obtain a more free Motion: But then you ought to ſcarify deep, as he obſerves. Scarification and Cupping upon the Occiput is alſo extremely uſeful in an Ophthalmia, or Inflammation of the Eyes, and a like Diſcharge procured by deep Scarification upon the affected Side in a Pleuriſy, after Phlebotomy premiſed, gives great Relief, according to LANCISI[d]. Laſtly, this Method of evacuating by Scarification and Cupping, makes one of thoſe which are generally repeated at ſtated Seaſons of the Year, like Bleeding and Purging, Spring and Fall, *&c.* which the Patient being once accuſtomed to, ought never to neglect them, for fear of incurring their former, or even worſe Diſorders.

Scarification by ſome rejected and deſpiſed.

V. I muſt indeed own, that there are many among our Phyſicians and Surgeons who contemn this Operation as of little or no Efficacy: And the Reaſon which they offer is, that hereby only that Blood is diſcharged which lodges itſelf betwixt the Fleſh and Skin. But this Judgment ſeems too haſtily formed, and

[a] Tract. *De Inſtrument. Chirurg.* Tom. I. pag. 413. [b] Scarification of the Ancles is highly recommended by Jo. TAC. MANN, of *Padua*, in a Treatiſe, publiſhed *A.* 1583. [c] *Adverſar. Anatom.* V. pag. 83. & VI. pag. 108. ZACUTUS LUSITANUS alſo mentions a Patient freed from an Apoplexy by repeated Scarification. [d] *Ibid. Adverſ. Anat.*

without

without a just Foundation. For Experience hath taught myself and many other eminent Physicians, that as much and as thick Blood may be discharged by Scarification and Cupping, as by Phlebotomy, and consequently it must be little less, if not equally beneficial, in all those Disorders which require Bleeding. But this I can boldly affirm, from my own Reason and Experience, that in some Cases Scarification excells Phlebotomy, in as much as the Cupping-glass, by firmly adhering to the Skin, not only draws out the Blood, but also gives it a greater Impetus or Tendency towards the scarified Part; and therefore it constantly gives certain and speedy Relief in most Disorders of the Head, Eyes, and Ears, Apoplexies, sleepy Disorders, Inflammations of the Tonsils, Hæmorrhages, and Pains of various Kinds, *&c.* sometimes by Revulsion, and sometimes by Derivation.

Whether Scarification be dangerous.

VI. There are again other Physicians, who imagine Scarification to be not only useless, but even pernicious: For, say they, We have Instances of Patients who have been not only violently disordered, but even killed by the Operation being performed at an improper Time, or with an unclean or infected Instrument. [a] Thus a Patient may be in danger of catching some foul Disorder by being scarified with an Instrument that has not long before been used upon one infected with the Leprosy, Pox, Itch, *&c.* for thus the Infection will be inoculated almost in the same Manner with the Small Pox [b]. But if Scarification must be condemned and rejected on this Account, so must also Phlebotomy and many other Operations, in which the same Instrument is applied that has been used before. But that the Patient may have no Uneasiness from this Quarter, it may not be improper for him to see that his Cupper's Scarificator and Apparatus are very clean: Or else they may keep a Scarificator of their own, which being kept clean and dry, can give no room to make any frivolous Scruples of this Nature.

The Scarification used by Surgeons.

VII. There still remains another Sort of Scarification, used by Surgeons in violent Inflammations, incipient or confirmed Mortifications, pestilential Carbuncles, and the like. In which Cases it has been found highly serviceable to discharge the stagnant and vitiated Blood, by making many small Wounds or Incisions in the Skin with a Scalpel or Lancet, though without the Assistance of Cupping-glasses. This Kind of Scarification is usually denominated *Chirurgical* by the Cuppers, in Contradistinction to theirs: As Surgeons use it frequently in Gangrenes and Mortifications, and sometimes in swelled Legs and Dropsies, especially that of the *Scrotum*, and sometimes for the *Hydrocephalus*. But though it may be sometimes highly necessary to scarify the Legs of dropsical Patients, when the Skin is distended so as almost to burst: Yet it ought not to be made indiscriminately, without absolute Necessity, and a proper Regard to the Patient's Age, Habit, *&c.* Otherwise it is even probable, that the scarified Part will gangrene or mortify, and destroy the Patient. PLINY (*Hist. Nat. Lib.* LXXVIII. *Cap.* 1, & 11.) recommends Scarification of the Gums for the Tooth-ach; which, in my Opinion, may not unfrequently be very useful.

[a] Thus HILDANUS, *Cent.* V. *Obs.* 71. remarks, that a Palsy arose from hence, though it might proceed from a Multitude of different Causes.

[b] *Vid.* JORDANUS *De lue novâ in Moravia.* SPORICHIUS *De Symptom. Crudel. a Scarificatione.* LIBERIUS *De malitiosâ scarificatione, in Obs.* GREG. HORSTIS, *L.* IV.

The *Egyptian* Scarification.

VIII. Related to Scarification is the Infliction of small Wounds within-side the Nose, Lips, Ears, and Gums, used by the *Egyptians*, and recommended by [a] CELSUS and [b] ARETÆUS for abating Inflammations, and relieving various other Disorders, in which it very often succeeds admirably. At which we need the less wonder, if we consider what Relief Nature herself often gives the Patient, by making a plentiful Hæmorrhage at the Nose, in ardent Fevers, Head-achs, &c. Add to this, that the *Egyptians* [c] had a Practice of beating or whipping the Calves of the Legs with Rods, till they looked red, and then scarifying, or making Incisions in the Skin: By which means they procured Relief, and made useful Revulsions from the Head and Brain in violent inflammatory Disorders of those Parts, and in Fevers with Delirium, Watchings, &c. But notwithstanding the Usefulness of this Practice, it is at present hardly so much as known among our *European* Nations.

Scarification of the Eyes.

IX. Many of the antient Physicians and Surgeons, with HIPPOCRATES, had a Practice of scarifying the Insides of the Eyelids, and even the Eyes themselves, with a proper Instrument for the Purpose, in many of the Disorders which infest that Organ, as is very apparent from the Treatise which HIPPOCRATES has left, *De Visu* [d]. This Operation of scarifying the Eyes, though neglected from the Time of HIPPOCRATES, has yet been renewed, or lately introduced again, by the *English* Oculist WOOLHOUSE, at *Paris:* And it has been also performed with tolerable Success by some others of the present Age, as we have Accounts. But for the Instruments, and Manner of performing this Operation, we shall be more particular in our following Account of the Operations for the Eyes.

CHAP. XVII.

Of BLEEDING *by* LEECHES.

Choice of the best Leeches.

I. LEECHES, or *Sanguisugæ*, are a Species of aquatic Worms or Insects, of the Shape represented in *Tab.* XII. *Fig.* 5. which being applied to any Part of the Body, bite through the Skin, and extract Blood from the small Veins, which frequently conduces much to the Health and Recovery of a Patient: For which Reason they have been used from the most early Times by the antient *Greek* and *Roman* Physicians, as may be seen in GALEN's professed Dissertation on this Insect, commented on by SEBEZIUS. As there are Leeches of different Kinds and Natures, it will first be proper to distinguish and make a due Choice of the best. These are always found in clear Brooks or Rivulets: Whereas those taken from Lakes, Fish-ponds, and stagnant Waters generally have something malignant in their Bite, insomuch as sometimes to excite great Pain, Inflammation, and Tumor in the Part, and Uneasiness in the whole Body.

[a] *Lib.* IV. *Cap.* 2. where he directs to draw Blood from the Nose in violent Head-achs.

[b] *De Chron. Morb. Lib.* II. *Cap.* 11. *De Cephalia*, pag. 128.

[c] PROSP. ALPINUS, *Medicina Ægyptior.* p. m. 72. where you have a Figure of this Practice.

[d] CELSUS likewise advises Scarifications in the Head for many Disorders of the Eyes, and particularly violent Inflammations, *Lib.* VI. *Cap.* 6. The Success of which I myself have experienced.

In

It is alſo an Obſervation made by ſome of the moſt expert Surgeons, that the beſt Leeches have ſlender and pointed Heads, with greeniſh and yellowiſh Lines or Streaks on their Backs, and their Bellies of a reddiſh yellow: Whereas thoſe are the worſt, or moſt malignant, which having a thick and obtuſe Head, and incline from a dark blue to a black Colour on the Back and Sides. But you ought to obſerve it as a neceſſary Caution, never to apply Leeches which have been lately catched in Rivers or foul Waters, before they have been kept ſome time in a Glaſs full of clean Water, to be often ſhifted, that they may cleanſe themſelves from what Filth or Venom they may have imbibed: And when they have been thus kept for a few Months, they may be afterwards ſafely uſed, without incurring any bad Accident.

Method of applying them.

II. Before the Leech is applied to the Skin, it ſhould be taken out of the Water to ſtand about an Hour in an empty Cup, or other Veſſel, to drain itſelf; that being thus rendered thirſty and empty, it may both adhere more firmly to the Part, and draw off a larger Quantity of Blood. As for the Part to which they may be applied, that may be on the Temples or behind the Ears, when the Diſorder lies in the Head or Eyes, and eſpecially when the Patient is delirious in a Fever, or overcharged with Blood. But ſometimes they may be commodiouſly enough applied to the Veins of the *Rectum*, in Diſorders proceeding from an Obſtruction of the wonted Evacuation this Way, or in the blind and painful Piles: And by Way of Revulſion they will be here uſefully applied in profuſe Hæmorrhages of the Noſe, and ſpitting or vomiting of Blood; in which Caſes they are of incredible Service, eſpecially when the Diſorder ariſes from Obſtructions of the hæmorrhoidal Flux. But before you apply the Leech, the Skin of the Part muſt be firſt well rubbed till it becomes hot and red. Which done, you take hold of the Leech by its Tail with a dry Cloth, or you may place it leaning half way over the Edge of a Cup, and ſo apply it that it may creep out upon the Part; which they are no ſooner fixed upon, but they generally bite and draw the Blood very eagerly. When ſeveral Leeches are to be uſed, you muſt apply each of them to the Part in this Manner ſucceſſively: and if they ſhould refuſe to bite or adhere to the Skin, as they ſometimes do, you may, in that Caſe, put a little Blood of a Pigeon, Chicken, *&c.* upon the Skin. But if that will not allure them, you muſt apply freſh Leeches in their ſtead. The Application of Leeches to the Caruncle in the greater or inner Canthus of the Eye, is found to be extremely uſeful in all inflammatory Diſorders of that Organ, after Phlebotomy has been firſt premiſed.

Treatment after their Application.

III. When the Leeches are diſtended with Blood, they generally ſeparate from the Skin, and leave the Part of themſelves. But if it be neceſſary to draw ſtill a large Quantity of Blood, you muſt either apply freſh Leeches, or elſe cut off the Tails of thoſe which are drawing with a Pair of Sciſſors, by which means the Blood will run through them, and they will draw almoſt as long as you pleaſe. If the Leeches do not ſeparate ſpontaneouſly after a ſufficient Quantity of Blood has been evacuated, upon ſprinkling a little Salt or Aſhes upon the Part, they uſually leave it preſently: Which Method ſhould be the rather taken, becauſe forcing or pulling them away often occaſions a Tumor and Inflammation of the Part. The Operation being thus finiſhed, thoſe Leeches which are whole may be returned into the Glaſs again and reſerved for future Uſes: But thoſe die which have had their Tails cut off. The Wound made by this Inſect may be firſt waſhed with warm Wine or Water, and then dreſſed with ſome vulnerary

nerary Plaſter: Though there is ſeldom any Occaſion for the latter, as it generally heals up faſt enough of itſelf. They who deſire more upon this Inſect, may conſult GALEN, ALDROVANDUS, GESNERUS, BOTALLUS, PETR. PAUL. MAGNUS, SEBIZIUS, HEUNIUS, CRAUSIUS, SCHRADERUS, STAHLIUS, *&c.* who have wrote thereof more at large.

CHAP. XVIII.

Of ACUPUNCTURATION, *uſed by the* Chineſe *and* Japoneſe.

SOmewhat a-kin to Scarification is the famous Operation of the *Chineſe* and *Japoneſe*, termed *Acupuncturation*. Thoſe Nations rejecting Scarification and Phlebotomy as pernicious, have Recourſe to their Acupuncturation and Cauterization, or burning with *Moxa*, as their moſt potent Remedies in almoſt all Diſorders. The firſt of theſe Operations they perform with a large Gold or Silver Needle (*Tab.* XII. *Fig.* 6.) which they ſtrike into the Fleſh, either with their Hand or the little Hammor, *Fig.* 7. It is indeed more than a little ſurpriſing, that ſo deſperate and ſevere an Operation ſhould be ſo much practiſed by a People in other reſpects judicious: And that too, in the Head, Breaſt, Abdomen, Arms, Legs, Thighs, and moſt other Parts of the Body; even in the Abdomen of Women with Child, when the Fœtus is reſtleſs. But I do not know that the Practice has been received by any of our *European* Nations: And therefore, as the Proceſs is ſo much abhorred, we ſhall not here give a prolix Account thereof. They who deſire more, may conſult RHYN *De Arthritide*, pag. 145, 183, 190; and KOEMPFER *in Amœnitatibus exoticis*, pag. 582; alſo in his Deſcription of *Japan*: In which Country both theſe Surgeons where Spectators of the Operation.

CHAP. XIX.

Of ISSUES.

The Seat of Iſſues.

I. ISSUES are little Ulcers made deſignedly by the Surgeon in various Parts of the Body, and kept open by the Patient, for the Preſervation or Recovery of his Health. They are by ſome [a] denominated *Cauteria*, but improperly: Becauſe by that Term we uſually mean a cauſtic or corroding Medicine. In this Operation the Phyſician endeavours, by Art, to imitate and relieve Nature; who often forms Ulcers in various Parts of the Body of her own accord, for diſcharging pernicious Humours, whereby People are often freed from grievous Diſorders, and enjoy a healthy State. The Parts in which Iſſues are generally made, are either, (1.) the upper Part of the Head; (2.) the Neck; (3.) the Arms, betwixt the Biceps and Deltoeide Muſcle, near the Inſertion of the

[a] CAPIVACCIUS has a Diſſertation *De recta Cauteriorum Adminiſtratione*, in which he treats only of Iſſues, which the *French* alſo term *Cauteres*.

laſt;

laſt; (4.) in the Thighs, eſpecially within-ſide, immediately above the Knee, in a Cavity eaſily felt by the Fingers; and laſtly, (5.) Iſſues are ſometimes made in the Legs, on their interior Side, in a Cavity immediately below the Knee.

II. Though there are ſeveral Methods of making Iſſues, yet none ſeem to be more ready than the following: *viz.* Firſt, to mark the proper Place with Ink; and then elevating the Integuments betwixt the Thumb and Fore-finger of the Surgeon and an Aſſiſtant on each Side, you next proceed to make an Inciſion through them, either with the Scalpel or Lancet, big enough to admit a Pea. Which being inſerted and covered with a Plaſter and Compreſs, nothing more is wanting than your Roller to compleat the Operation. Thus by cleanſing and dreſſing the Wound every Morning and Evening with a freſh Pea, it by Degrees, in a Day or two, degenerates into a little Ulcer, diſcharging daily a Quantity of purulent Matter; which ſhould be carefully cleanſed or wiped off at every Dreſſing. The firſt Method of making Iſſues by Inciſion.

III. There is a ſecond Method of making Iſſues by wounding the Skin with a red-hot Iron, or actual Cautery; which is uſually included in a Sort of Capſula, or Caſe of Iron, *Tab.* XII. *Fig.* 8. A, to conceal it from terrifying the Patient. When the Caſe B B is fixed upon the proper Part for the Iſſue, the Cautery, or red-hot Iron C, is then preſſed down upon the Integuments, and the Eſchar or Burn, is next to be dreſſed with freſh Butter, or *Ung. Baſilic.* till it at length ſeparates in repeating the Dreſſing every Day. Then the little Ulcer formed is to be filled with a Pea, and dreſſed as before. Though this Method of making Iſſues, according to the Antients, is more ſevere, yet it muſt be equally more efficacious than the other; as the Pain and Cauterization muſt neceſſarily make a conſiderable Revulſion. But there are very few Patients who will ſubmit to it. A ſecond Method by the actual Cautery.

IV. The third and laſt Method of making Iſſues, is, by the Application of potential Cauteries, or corroding Medicines: In order to which, a Piece of Plaſter is firſt perforated, as in *Tab.* XI. *Fig.* 11. and then applied, ſo as its Aperture may cover the Place marked with Ink for the Iſſue. A Piece of the Cauſtic, mentioned *Part* I. *Book* IV. *Chap.* III. *Sect.* XI. is then impoſed upon the Aperture of the Plaſter, and retained cloſe down upon the Skin with ſome ſcraped Lint, a ſmall Compreſs, and a large Plaſter; and laſtly, with a larger Compreſs and Bandage. The Operation thus far advanced, the Patient is now to be ordered to reſt about ſix or eight Hours, more or leſs, according as the Cauſtic may be in Strength: Which Time being elapſed, and the Dreſſings removed, the Eſchar is to be treated as we before directed at *Sect.* III. A third Method by Cauſtics.

V. But in whichever of theſe Methods you make the Iſſue, it muſt be dreſſed at leaſt twice every Day, eſpecially if it runs well, and in the Summer time; And at each Dreſſing you muſt put in a freſh Pea, and cover it with a clean Plaſter, or Piece of waxed Paper or Silk, or an Ivy-Leaf, retained with Compreſs and Bandage. But the Deligation for Iſſues is much more commodiouſly performed with a leathern Swath, faſtened by Claſps, as in *Tab.* XII. *Fig.* 9. than by a circular Linen Roller. It is remarkable, that ſome uſe Peas of Silver or Wood to dreſs their Iſſues with, inſtead of the common ones: But the Difference in their Effects is not material. In this Manner Iſſues are to be kept open, till the Patient is recovered of the Diſorder for which they were made; and

and in some Cases they should be continued as long as the Patient lives: Or if the same Disorder, or some other, returns upon drying them up, they must be again opened immediately.

Use of Issues.

VI. Issues are used chiefly for various Disorders in the Head, Eyes, Ears, the Teeth, or Sciatica, and other painful Disorders, which are this way frequently relieved or cured. The Use and Advantage of Issues is well known, and daily experienced by most Surgeons[a], contrary to the Opinion of Helmont, and some others, who think they serve only to torment and trouble a Patient. However, I must frankly own, that a Cure is not to be expected from Issues; and though they generally give some small Relief, yet in many Cases I have found it too inconsiderable to be sensible: But if, upon Trial, they afford no great Benefit, it is best to dry them up again in a little Time. But we must not forget to take notice, that it is frequently necessary to make two or more Issues, to produce any considerable Effect in stubborn Disorders, as one in each Arm, or in one Arm and Leg of the same Side, *&c.*

Method of drying up Issues.

VII. In order to close up an Issue, when that shall be judged proper or necessary for various Reasons, little more is required than to discharge the Pea, and refrain from putting in any more, by which means alone it will close up in a short Time. But if any proud Flesh should protrude itself, it may be amputated, or else removed and taken down with *Alum. ust.* Lastly, it is observable, that when Issues of People far advanced in Years cease to make their wonted Discharge, and turn of a livid and blackish Hue, it is a Sign they are invaded by some desperate Disorder, and that even Life itself is very near its Period. In this Case proper topical Remedies should be speedily applied, as *Cantharides*, *Rad. Irid. Florent. vel Helleb. nigr.*

CHAP. XX.

Of Blistering *with* Cantharides.

Blistering described.

I. By Blistering is understood an Elevation of the Cuticle, from the Cutis into Vesicles, or Bladders replete with a serous Humour, by the Application of external Remedies, and chiefly Cantharides, to the Skin, which may be applied either in form of a Paste mixed up with Yeast; or else mixed with some Emplaster, and then spread on Linen or Leather, which is the modern Practice: And therefore we constantly meet with the *Emp. Vesicator.* ready prepared in the Shops of Apothecaries. These being applied and retained upon the Part with Bandage and Compress, in about eight, ten, or twelve Hours Time, will raise the Cuticle under the Plaster in a Blister, replete with a thin and acrimonious Lymph. The beforementioned Number of Hours being expired, the Blister-plaster is removed; and the Cuticle, if yet entire, is opened with a Pair of Scissors, its Contents being gently absorbed by Lint or soft Linen. This

[a] Vid. Galvani *Trattato delle Fontanelle.* Glandorpii *Gazophylacium, &c. Act. Hafnienf.* Vol. iii. xii. Muysii *Prax. Med. Obf.* 2. Schelhammerus, Fred. Hoffmannus, Hilscherus, *&c.* in *Dissertationibus.*

done,

done, the Part blistered is dressed with some soft and cooling Plaster, which Dressing is repeated every Morning and Evening, till the Discharge ceases, and the Part heals. And though it is remarkable, that the Cuticle is separated from the true Skin by this Plaster, in the same Manner as it is in Burns; yet it meets with so sudden a Reproduction, as is not a little surprising. Some make their Dressings with Beet or Dock-leaves, spread with fresh Butter, instead of a Plaster.

The Size of Blister-plasters.

II. The Size of Blister-plasters varies greatly with the Nature of the Patient's Disorder, and the Size or Figure of the Parts to which they are to be applied. Those for the Temples and behind the Ears, may be about the Size of a Crown Piece: As may also those for the Neck and Arms, Legs and Thighs, and the Top of the Head. But those for the Back and between the *Scapulæ*, may advance to two Hands Breadth.

The Use of Blister-plasters.

III. Vesicatories are frequently of very great Benefit, as well as Issues, in many of the most obstinate Disorders: Especially when vicious Humours are to be discharged from the Blood, or a strong Revulsion to be made from any Part. Thus Vesicatories are of excellent Service behind the Ears, upon the Head, Neck, Arms, *&c.* in all Inflammations of the Eyes, and Suffusions or incipient Cataracts: As they likewise are in all lethargic and paralytic Affections: In which Cases they give a Stimulus to the Blood and Spirits, and excite those Fluids from a languid to a brisk Motion. Strong Vesicatories are also frequently used in ardent Fevers attended with a Delirium: In which Disorders they are properly applied to the lower Extremities, in order to diminish the Influx of Blood sent to the Head and Brain. Lastly, Blisters are used with great Success in the Small Pox[a], when the Pustules seem to strike in; as also in the more obstinate arthritic and rheumatic Complaints, where they are best applied even to the Part in Pain, according to the Observation of SCULTETUS (*Obs.* 73.) Blisters are also of great Efficacy when applied to the Legs and Thighs in Asthmas; and a little below the Elbow for the Tooth-ach.

How to increase the Force of Blisters.

IV. When the Disease requires a considerable Discharge this Way, it may be convenient to mix a little Powder of Cantharides with the Ointment or Plaster, with which the Blister is to be constantly dressed: By which means greater Benefit may be obtained than one would imagine, in many of the most obstinate Diseases.

V. There is another Case, in which *Cantharides* are of great Service. When Issues, or Ulcers of the Legs, which are of long standing, stop, either spontaneously, or from some Disorder (especially if the Patient is advanced in Years;) in this Case sprinkle *Cantharides* on the Issue or Ulcer: Let a Piece of Blistering-plaster be made in the Form of a Pea, and be applied to the Part. The Humours that before ceased, will generally be provoked by the Stimulus of the *Cantharides*, and be discharged again to the great Benefit of the Patient. Add to this, that in some Wounds (particularly after the Operation of Lithotomy) where the Lips of the Wound become callous, the Application of *Cantharides* destroys the Callosity; and the Wound heals without Difficulty. See CHESELDEN, and DOUGLASS, *Lib. de Lithot.* But this Application is sometimes attended with an *Ardor Urinæ*, or great Heat and Pain in making Water; especially if the Blisters are several in Number, and stronger, or continued longer on the Parts than usual: In which Case the Patient suffers the same Symptoms as

Blisters often accompanied with *Ardor Urinæ*.

[a] See FREIND's excellent *Treatise on Fevers* and the *Small Pox*.

if he had taken *Cantharides* internally. But then theſe troubleſome Symptoms are as quickly removed by a frequent and plentiful drinking warm Milk, and amygdalate Emulſions. Laſtly, Bliſters ſhould not haſtily, but with great Caution, be uſed for Patients who are hydropic or cachectic; becauſe they frequently produce an incipient or confirmed Mortification. See BAGLIVI on Bliſters, HOFFMAN, VATER, and others.

CHAP. XXI.

Of INJECTIONS.

Of Injections in general.

I. MANY Diſorders are very difficultly, if at all, curable, unleſs the Parts affected are injected with ſome proper Liquor, by means of a Syringe and a proper Tube. Which Operation is by Surgeons called *Injection*, and conſiſts chiefly in drawing the Liquor into the Syringe, and forcing it out again into the diſordered Parts. The Method of performing which is too obvious for any body to be ignorant of. But this Obſervation may be neceſſary, To apply the Syringe and Tube to the Parts very carefully, eſpecially in very ſenſible or nervous Parts, to avoid giving the Patient too much Pain: Alſo to be mindful, that the Liquor you inject be not too hot or cold. But what Kinds of Liquors and Methods are to be uſed for Abſceſſes and fiſtulous Ulcers, we have before obſerved (in the Book on *Ulcers*, *Chap.* II. *N.* III.)

In Diſorders of the Mouth and Fauces.

II. In Ulcerations and Inflammations of the Tonſils, Uvula, and Fauces, Injections are generally uſeful: But Care is to be taken to preſs down the Tongue with a Spatula (*Tab.* I. *litt.* P) or the flat End of a Spoon; and having introduced the Syringe two or three Fingers Breadth into the Mouth, the Injection is to be gently thrown in, ſeveral Times. A proper Syringe for this Purpoſe is deſcribed by DEKKERUS (*Exercit. Pract.* pag. 242.) furniſhed with a crooked Tube, whoſe Extremity is perforated with ſeveral ſmall Holes, as in *Tab.* VI. *Fig.* 11. This Inſtrument is particularly uſeful, when the Patient's Mouth cannot be eaſily opened by a Spatula, which is often the Caſe.

In Gonorrhœas.

III. Injections are alſo frequently thrown into the Urethra of the Penis, in Men under a Gonorrhœa, in order to waſh out the corrupt Matter, and mitigate the Heat, Acrimony, and Pain. The beſt Syringe for this Purpoſe is that in *Tab.* IV. *Fig.* 10. fitted with a convenient Tube to enter the Penis. Alſo the Syringe in *Tab.* XII. *Fig.* 10. may be very commodiouſly uſed in this Caſe; becauſe the Liquor does not eaſily fly out of it behind. The moſt convenient Liquors for abating the Heat and Pain in this Diſorder, are, warm Milk and Barley-water, ſweetened with Sugar, Honey, or Syrup of Marſhmallows: And after the Uſe of theſe, when we would heal up and ſtrengthen, or gently aſtringe the Parts, we may uſe the following Mixture with Succeſs:

℞. *Aq. Plantag.* ℥iv. *Mell. Roſat.* ℥j. *Sacch. Saturni* ℈j. *M. f. Injectio.*

In Diſorders of the Uterus.

If a ſmall Stone ſhould happen to ſtick in the Urethra, its Exit may be very much promoted by injecting Oil of ſweet Almonds or Olives by the Penis. For Diſorders in the Uterus, to expel the After-burthen, when it adheres too ſtrictly to the Womb, or to cure Ulcers that Part, or cleanſe the *Fluor Albus*,

bus, it is convenient to inject ſome deterging and healing Liquor, by the Syringe which Mauriceau has deſcribed for that Purpoſe. See *Tab.* VI. *Fig.* 12 and 13. But when this Syringe is uſed, the Surgeon ſhould be careful that its foremoſt high Tube be cautiouſly introduced into the Vagina. To anſwer this End in a ſtubborn *Fluor Albus*, I have experienced the Syringe at *Tab.* XII. *Fig.* 10. to be very convenient.

IV. Laſtly, for the Manner in which Liquors are to be injected into the *Thorax* or *Abdomen*, to cure Ulcers or Wounds in thoſe Parts, that has been before deſcribed, when we treated of Wounds. As to the Liquors which are injected by the *Anus*, under the Title of Clyſters, we ſhall conſider them when we come to treat of the Operations proper to that Part. In Diſorders of the Thorax and Abdomen.

CHAP. XXII.

Of Actual Cauteries.

I. Cauteries are by Phyſicians and Surgeons diſtinguiſhed into two Claſſes, actual and potential. By actual Cauteries they intend red-hot Inſtruments, uſually of Iron, which are applied to many Parts and Diſorders. By potential Cauteries we underſtand certain Kinds of corroding Medicines, of which we ſhall ſpeak hereafter in *Chap.* XXIV. Of actual Cauteries, or hot Irons, it is neceſſary for the Surgeon to have a conſiderable Apparatus: Inaſmuch as different Diſorders require Cauteries of various Sizes and Figures. Notwithſtanding there are a greater Number of cauteriſing Inſtruments deſcribed and figured by the Writers in Surgery [a], the chief of which we have given you in *Tab.* III. yet it may be neceſſary for the ſkilful Surgeon to invent others, ſuitable to the particular new Diſorders which may ſometimes occur to him. The ſeveral Sorts of Cauteries.

II. Cauteries have various and manifold Uſes. For they are not only uſed to deſtroy the dead Parts of carious Bones, in Cancers, to remove *Schirri*, Excreſcencies, Carbuncles, and mortified Parts; but alſo to make Iſſues and Setons, to ſtop Hæmorrhages in Wounds and Amputations: And, Laſtly, to remove an Amauroſis, Epilepſy, Sciatica [b], with Pains in the Teeth and other Parts. We are therefore ſo far from condemning the Uſe of Cauteries, as have Septatius, Helmont, Bontekoe, Overkampio, Crahn, *&c.* that we rather recommend them as eminently ſerviceable in many of the beforementioned Diſorders. They who are deſirous of ſeeing more upon this Subject, may read Albucasis Arabs and Severinus concerning the wonderful Effects of cauteriſing, in his elegant Book *De Efficaci Medicina*, *&c.* He may likewiſe conſult Jo. Cost. *Prof. Bonon. de igneis Medicinæ Præſidiis*, Venet. 1595. To theſe add Fienus and Bartholinus *De Cauteriis*. The Uſe of Cauteries.

III. For the right Application of Cauteries, various Obſervations are neceſſary. In the firſt Place, the Surgeon ſhould ſee that the Size and Figure of the Cautery correſpond to that of the diſordered Part: And while the Patient is preparing for the Operation, to let the Cautery be heating in the Fire. After The Application of Cauteries.

[a] See Albucasis, Paræus, Andreas a Cruce, Scultetus, *&c.*

[b] Scultetus *Obſ.* 72. Tulpius, *Lib.* iii. *Cap.* 36. Deoker, *Exercit.* pag. 54.

which, it will be neceſſary to ſecure the ſound Parts from the Cautery, to prevent giving more than neceſſary Pain. For this Reaſon it is, that the fleſhy Parts upon a carious Bone are firſt drawn and held aſide by the Fingers of an Aſſiſtant, before the Cautery is applied. When the Inſtrument is ſufficiently hot, it is to be applied and ſtrongly compreſſed upon the diſordered Part, till the Surgeon perceives the Bottom of the diſordered Parts appear ſound. To effect this the more ſpeedily, it will be neceſſary to have ſeveral Cauteries in Readineſs, that if one be inſufficient, he may uſe a ſecond or a third: Which Caution is more eſpecially of Conſequence to be obſerved in carious Bones and large Hæmorrhages.

The Uſe of Cauteries in Apoplexies.

IV. It may be here not amiſs to take notice, that ſeveral Phyſicians have found by Experience, that Cauteries have ſucceeded in Apoplexies, when all other Remedies have failed. But for the Part to which the Cautery is to be applied, there are various Opinions. SCULTETUS, in *Obſ.* 34. is for having it to be applied to the Occiput: But ZACUTUS LUSITANUS, and RIVERIUS, think it much better to cauterize between the firſt and ſecond Vertebra of the Neck. Others again pitch upon the Meeting of the coronal and ſagittal Suture: And Others prefer different Parts. MISTICHELLIUS, an *Italian* Writer upon the Apoplexy, aſſerts, that no Place can be ſo well pitched upon for Cauterizations in Apoplexies, as the Soles of the Feet. But the Manner in which the Soles of the Feet are to be cauterized in that Diſorder, the forementioned Author has endeavoured to demonſtrate in a particular Table, for which ſee *Tab.* XII. *Fig.* 11. where the Parts to be cauterized are ſignified by the Letters A A, the Cautery by the Letter B. Though that Inſtrument may doubtleſs be of another Figure than a ſquare one. I tried this Practice upon a Perſon in an Apoplexy: But, inſtead of recovering, he died.

CHAP. XXIII.

Of BURNING *with* MOXA.

TO Cauterizations it may not be improper to join burning with Flax and *Moxa*, which latter is a kind of downy Subſtance, ſeparated from the Leaves of a Sort of *Indian* Mugwort, and is uſed by the *Indian* Nations: But the firſt we find was uſed by HIPPOCRATES[a], and the other ancient Phyſicians, to cauterize Parts in Pain[a]. Some of the Moderns wonderfully extolled Cauterization with *Moxa*, as the moſt effectual Means to cure, and wholly extirpate the Gout. But for the Art of cauterizing with it, it may be neceſſary to obſerve the following Particulars: (*viz.*) In the firſt Place, to make a ſmall Cone of the Lint or *Moxa*, about a Thumb's Breadth long, (See *Tab.* XII. A B, at the Letter A and B) made much after the ſame Manner as they uſually are for a Suffitus. The Baſis of this Cone is to be ſtuck upon the Part with Gum Arabic, or Gum Tragacanth, and its Point is then to be fired by a Candle, or a burning Coal. By this means not only the Cone will be gradually conſumed, but the painful Part will be at laſt by Degrees cauteriſed, and thence the Pains of the

[a] *Lib. de Affect. Cap.* 30. [b] CELSUS, *Lib.* IV. *Cap.* 23.

Gout

Gout will frequently have some Remission. But if the Pains do not entirely vanish at the first, a new Cone is to be applied again to the Part, and the Cauterization thus continued till the Pain ceases. But, however this Process may have been cried up by many of the *Europeans*, it is at present quite in Disuse, and that not without Reason: For, besides the acute Pain which it causes, it is frequently found to have little or no Effect. But the *Chinese* and *Japonese* have the Operation at this Time in the highest Esteem; insomuch that it, with their Acupuncturation, makes their chief Remedies.

These Cauterizations are said to be at present in use among the *Arabians*. More may be seen upon this Head in Rhynius *De Arthritide*, pag. 145. Cleyerus *in Medicina Sinica*. Purmannus *in Chirurg. Pars* III. pag. 292. Pechlinus *in Obs.* pag. 263. Valentini *Polychrest. Exotic.* pag. 197. and a particular Dissertation upon *Moxa:* And, lastly, Koempfer, *in Amœnit. Exotic.* pag. 589. and in his *Histor. Nat. Japon.*

CHAP. XXIV.

Of Caustic *and* Corroding Medicines.

I. CAUSTIC and Corroding Medicines, as they are called by our Surgeons, are those Medicines which being applied to Parts, consume, and, as it were, burn them like hot Irons: Whence the *Greeks* gave them the Names of *Caustics*; and Celsus[a] denominates them *Adurentia* and *Exedentia*. However they differ in this from actual Cauteries, that they perform their Effects slower and with less Force and Pain: Whereas in the Application actual Cauteries act instantaneously, and occasion most acute Pain. Potential Cauteries differ among themselves in various Degrees of Strength, according to their different Substance and Preparation: So that sometimes more, sometimes less, is applied to a Part for any Purpose. But among the various Kinds of potential Cauteries, the most considerable and effectual among us is the *Lapis Infernalis*, which is prepared *e Calc. Viv. & Cinerib. Clavellatis*, and which is applied for the opening Abcesses, as we have before mentioned *(in Part* I. *Book* IV. *Chap.* III. N° XI.) But there are some who prefer Lunar Caustic, or a Salt prepared from a Calcination of Soap-boilers Lees, or *Ol. Vitriol.* or a Solution of Mercury in *Aq. Fort.* Butter of Antimony, and a Mixture of Soap and Quick-lime; or, lastly, an arsenical or mercurial Sublimate, mixed with a little Honey. But it seems much safer to abstain from the arsenical and mercurial Sublimate, lest we should occasion those grievous Disorders and violent Pains, nay, even Convulsions and Death, which they sometimes produce[b]. In what Manner potential Cauteries are to be applied for opening Abcesses, and making Issues, we have before declared in *Part* I. *Book* IV. *Chap.* III. N° X. also *Part* II. *Sect.* I. *Chap.* XIX. N° IV. for these Cauteries are said to be strong enough to remove Warts, Tubercles, Excrescences, Sarcomas, encysted Tumors, Wens, and schirrous Tumors, if they are properly applied either superficially, or to the Root of the disordered Parts. By these an Hydrocele may be conveniently opened, and

The Use of Caustics.

[a] *Lib.* V. *Cap.* 7 & 8. [b] This Hildanus mentions, *Cent.* VI. *Obs.* 22, & 80.

even a whole cancerous Breast may be removed. A considerable Instance of the Success of this Practice in *Germany*, we have from the celebrated Sutorius of *Norimberg*, afterwards Surgeon to the Duke of *Brunswick*. But great Caution is necessary in this Kind of Practice, not to irritate such Parts and Disorders by these Medicines, which, if they should prove inflexible, might endanger the Patient's Life. For thus a Schirrus may often be turned into a Cancer: And if they are applied to the Eyes or Eye-lids, they may hurt Vision, and may sometimes occasion profuse Hæmorrhages, if applied near large Veins and Arteries. Or, lastly, they may occasion Convulsions by injuring the Nerves: Though perhaps these are not all the bad Consequences that may attend an injudicious Use of potential Cauteries. But for the skilful Application of them, we shall give some Directions hereafter.

CHAP. XXV.

Of Opening Abscesses.

THE Methods to be used for opening Abscesses, I think, have been already described in *Part* I. *Book* IV. *Chap.* VIII. N° VIII. Therefore to avoid Tautology, we shall refer our Reader thither.

CHAP. XXVI.

Of Warts.

The various Kinds of Warts.

WARTS are commonly known to be small Excrescences of the Skin, seated in most Parts of the Body, but chiefly in the Hands and Face. Their Size and Figure are very various: Some are very broad and flat; some again are very slender, and others appear in Form of a Pear hanging by its Stalk. These are commonly removed more for the Deformity they occasion, especially in the Face, Neck, and Breasts of beautiful Women, than for any Pain or Danger. And, notwithstanding the great Variety of superstitious and insignificant Remedies which are sometimes used by the Populace, and even some Physicians, for the Removal of Warts, none of them are so expeditious and certain as the Means which come from the Surgeon.

Cure by Ligature.

II. To come therefore to the Purpose, we shall briefly deliver the chief Artifices used by Surgeons for the Removal of these Excrescences. And the first that offers is that by Ligature: Which consists chiefly in this, violently to bind a Horse-hair, or a Piece of fine Thread or Silk about the slender and depending Root of the Excrescence. By this Means the nutritious Vessels being compressed, and the usual Supply of Fluids being cut off, it gradually withers and decays.

Cure by Extirpation.

III. A second Method of removing these Excrescences is, by some sharp Instrument, to wit, by taking them up by a Pair of Plyers, and cutting them cautiously off with a Pair of Scissors. The Wound is to be dressed for some Time

Time with *Lap. infernalis*, or ſome other cauſtic Medicine, that if there be any of its Root remaining, out of which a freſh Tubercle might ariſe, it may be corroded and deſtroyed.

IV. But if the Excreſcence is of the larger Kind, it is more adviſeable to have Recourſe to cauſtic Applications. But to make theſe act the more expeditiouſly, it may be proper to cut off the external and hardeſt Part of the Tubercle, either with a Scalpel, Razor, or Pair of ſharp Sciſſors, and then to dreſs the Wound with Oil or Tartar *per deliquium*, or Spirit of Salt. But if theſe ſeem not ſtrong enough for the Purpoſe, more vehement ones may be uſed; ſuch as Spirit and Oil of Vitriol, *Aq. Fortis*, and Butter of Antimony. On the contrary, the ſofter and ſmaller Kind of Warts may be removed barely by wetting with the Juice of Celandine, or the Milk of Spurge. In the mean time, Care ſhould be taken to prevent any of theſe Applications from getting into the Eyes, when they are uſed about the Eye-lids, which might blind the Patient. To prevent theſe Effects, it may be proper to circumſcribe the Wart with a Ring of Wax, or a perforated Piece of Plaſter, ſo that the Wart may come through; by which means the Wart only will be corroded, and the other Parts remain entire. By the ſame Methods other Tubercles and Spots, which deform a Perſon, may be removed. Removed by Cauſtic.

V. A fourth Method of removing Warts, is by ſome actual Cautery, accommodated to the Size of the Excreſcence, ſo that it may penetrate to its Root, when applied. (See *Plate* III. *Fig.* 13, 14.) Though there are many violent Means to extirpate Warts, none can equal that of the actual Cautery; which occaſions moſt acute, though uſually but a momentaneous Pain. The Part cauterized may be often dreſſed with *Baſilicon*, or ſome other digeſtive Ointment and cooling Plaſter, ſuch as *de Sperm. Ranar.* This is the moſt certain Method of removing theſe Excreſcences in whatever Part of the Body, the Eyes only excepted; for they never return. Removal by actual Cautery.

VI. The fifth and laſt Method is that uſed by Mountebanks upon the Stage, which conſiſts chiefly in anointing the Tubercle with ſome mollifying Ointment; after which they very violently pull it out by the Nails of their Fore-finger and Thumb. But as this Method of Cure is not very agreeable, ſo it is often found to be alſo ineffectual; for they generally return again from the Remainder of the Root. Removal by Evulſion.

VII. Laſtly, we are here not to omit taking notice of ſome Warts which are livid and blue; which are uſually ſeated in the Face, Lips, and about the Eyes, and are of a cancerous Diſpoſition, much better left to themſelves: For when they are irritated, they frequently degenerate into a Cancer, and miſerably torment the Face, Eyes, and other Parts in which they are ſeated. You will find a remarkable Inſtance of this Kind of Warts in Saviard's Obſervations, *Obſ.* LXVIII. *p.* 296. which, through an ill-judged Attempt of curing it, was attended with the moſt deplorable Symptoms, and deſtroyed the Patient. Cancerous Warts.

CHAP.

CHAP. XXVII.

The Method of removing EXCRESCENCES, *fleshy* TUMORS, *and* MARKS *from the* MOTHER.

What an Excrescence is.

I. EVERY preternatural Tumor, which arises upon the Skin, and grows in the Form of a Wart or Tubercle, is called an Excrescence. They are by the *Greeks* called *Acrothymia* [a]; and if they are born with a Person, as they frequently are, they are commonly called *Nævi Materni*, or Marks from the Mother. But if the Tumor is large, so as to depend from the Skin like a fleshy Mass, it is then usually called a *Sarcoma*. These Tumors arise in all Parts of the Body; more particularly in the Head, Face, Eyebrows, Neck, Breast, Abdomen, Anus, Legs, and Arms. But the worst of these Tumors are those, which arise in the private Parts. The Size and Figure of them are various, sometimes arising to a very considerable Bulk, which are described and figured variously by the Writers of Observations [b]. With regard to their Colour, some resemble that of the Skin, others are inclined to black or red. And, lastly, with regard to their Figure, some are like Strawberries, Mulberries, Grapes, Figs, Pears, Mice, and various other Figures.

Their Removal.

II. With regard to the Treatment of these, it is to be observed, that almost the same Artifices may here take Place as for the Removal of Warts, either by Ligature, the Knife, or actual and potential Cauteries, according as their different Sizes, Situations, Figures, the Patient's Habit of Body, his Will, and other Circumstances may require. For the rest, when any of these Excrescences have a very large Root, which the *Greeks* call *Mermyxia* [c], or if there are large Arteries or Veins near its Root, or if it be firmly joined to any Bone, or have a Tendency to turn cancerous [d], the Surgeon should then remove them with Caution: Or, when there is great Danger, he ought wholly to neglect them, to prevent exposing his Patient to greater Dangers. When these Tumors are seated near large Veins and Arteries it is often proper to have Styptics, Bandages, and often actual Cauteries in Readiness to stop the Hæmorrhage, especially if they are removed by Abscission.

[a] See CELSUS, *Book* V. *Ch.* 28. *N.* 14.

[b] See SCULTETUS, *Arm. Chirurg.* Plate XXV. ELSHOLST, History of the Cure of a *Steatoma*. PECHLIN. *Obs. Med.* Book III. 46. BARTHOLIN. *Hist. Anat.* Cent. I. 23. PURMAN. *Chirurg. Curios.* p. 50, 134, and 370. LAMESWERDE, in his Notes on SCULTETUS, has described many of a very remarkable Figure. The *English Philosoph. Transactions* give an Account of a very extraordinary Tumor of this Kind, that was taken off from the Cheek, weighing nineteen Pounds, *N.* 354. And the famous CULME has given a Description of a large *Steomatous Exostosis* in the Clavicle, with his Treatment of it; published at *Dantzick*, 1732.

[c] CELSUS, *Book* V.

[d] WEDELIUS saw a Case, where a *Nævus* turned cancerous on the Application of *Aquafortis*. *De Morb. Infant.* p. 10.

CHAP.

CHAP. XXVIII.

Of ENCYSTED TUMORS, *and especially* SCIRRHI, ATHEROMATA, STEATOMATA, MELICERES, *and others.*

1. WHEN Tumors that arise from different Parts of the Body are contained in certain membranous Coats, they are commonly called *Encysted Tumors*, being sometimes harder or sometimes softer, of a palish Colour, and usually attended with little or no Pain. These Kinds of Tumors arise almost in all Parts of the Body, from Obstructions, either in the Glands, or adipose Membrane; more especially in the Head, Face, and Neck, where they frequently occasion great Deformity: (See *Plate* XII. *Fig.* 13.) The membranous Coat with which they are invested, is often of a considerable Thickness, and is usually the Coat of the disordered Gland, or some of the adipose Cells. At their Beginning they are usually very small and moveable, being a considerable Time increasing by Degrees, till at last they sometimes arrive to an enormous and surprising Bulk. The Consistence of some of these Tumors is soft and fluctuating, of others more hard and consistent. The Figure of them is various, some being like Filberds, Acorns, Bullets, Wallnuts, and Eggs; others again like Pears suspended by a Sort of Stalk, like some of the fleshy Excrescences; some have a very large Root, and resemble ones Fist, Head, or other Figure. The Bulk of some of these Tumors has sometimes increased to that Degree as to weigh many Pounds[a]: Others of these Tumors so firmly adhere to the adjacent Parts as to be wholly immoveable, and become of so hard a Consistence as to resemble a bony *Callus*; though many of them always remain soft and moveable. Several Kinds of these encysted Tumors are variously distinguished by their different Consistencies. When their Contents resemble Paste, they are then called *Atheromata*; if they are of the Consistence of Honey, they are termed *Meliceres*; but if they are of a fattish Consistency, like Suet or Lard[b], they then take the Name of *Steatomata:* If they happen in a Gland which becomes indurated, the Tumor is then called *Scirrhous*; and, lastly, when they are of a fleshy Consistence, they are termed *Sarcomata.* Some of these Tumors, as[c] CELSUS has observed, have been found full of Hair. Again, these Tumors are variously distinguished and denominated from their different Situations: For when they are seated under the Scalp, they are called by the Name of *Talpa*, *Testudo*, or *Lupia*; when they are seated in the Neck, *Strumæ*, or *Scrophulæ*; but when they are situated in the Hands or Feet, especially near the Tendons of their Muscles, they are usually denominated *Ganglia.* Various Kinds of encysted Tumors.

II. These Encysted Tumors are usually discoverable without much Difficulty by the Eye and Hand: But they are very difficultly discernable from other Tumors barely by their external Signs, if we no not discover their Difference by Diagnosis of encysted Tumors.

a PETIT mentions one, that he extirpated, between the *Scapulæ*, of forty-eight Pounds Weight.

b I have had some under my Care, that resembled curdled Milk, or new Cheese; for which there is no particular Name. For steatomatous Swellings in the Head consult ROONHUYS, *Obs.* 17 and 20. A Cystic Tumor, that had many membranous Coats, is mentioned by MEEKEN, *Obs. Append.*

c *Lib.* VII. *Cap.* 6.

feeling whether they are harder, ſofter, or more or leſs coſiſtent. For as the external Skin receives little or no Alteration in its Colour in the ſeveral Sorts of theſe Tumors, we can therefore form little or no Judgment by it. Nor is it of any great Conſequence to be acquainted with the Nature of the included Matter, except the Hardneſs, before we proceed to the Cure of theſe Tumors: For, whatever Matter they contain, the Manner of Treatment is pretty much the ſame. It is however to be obſerved, that *Scirrhi* or *Sarcomata* are the hardeſt of any of theſe Tumors; next to theſe come *Steatomata*; all the reſt are ſtill ſofter, and may require ſome Variation in their Treatment, according to their Degree of Conſiſtence. Thoſe Tumors ſeated in the Neck, which are called *Strumous* and *Scrophulous*, are commonly thought to be the Glands in the Neck indurated: But I have frequently obſerved *Steatomata* and other encyſted Tumors in the adipoſe Parts of the Neck. For it ſeems ſcarce poſſible that thoſe very ſmall Glands which are ſituated in the Neck, ſhould grow to ſuch a ſtupendous Bulk as ſometimes to hang over the Abdomen: Whereas thoſe in the adipoſe Parts may eaſily do ſo. But beſides theſe, there are alſo frequently leſſer Tumors in the Neck, which ſeem to be thoſe Glands indurated and much enlarged, being in Fact a Kind of *Scirrhi*.

Prognoſis of encyſted Tumors.

III. When encyſted Tumors are without Pain, are neither too hard, nor too much enlarged, they preſage no great Danger, inſomuch that it is common for poor People, and thoſe who are afraid of the Surgeon's Hand, to bear them, to the End of their Lives, without any great Inconveniency. But when they grow too large, ſo as ſometimes to weigh ten or twenty Pounds; when they cauſe violent Pains, as ſcirrhous Tumors frequently do; then, beſides the intolerable Trouble they give the Patient, they alſo add great Deformity: And, if they are not timely removed, they often occaſion a Conſumption, or Cancer, putting the Patient in imminent Danger of his Life, as we before obſerved in the Chapter of *Scirrhous Tumors*. Every one muſt know, that, in the Treatment of theſe Tumors, for a Cure, the Aſſiſtance of the Knife is conſtantly to be called in: Becauſe they will not eaſily digeſt, or be brought to Suppuration, as we have already obſerved in ſcirrhous Tumors. In the mean time, thoſe Tumors are more ſafely and eaſily removed by the Knife, which are of no long ſtanding, are ſoft, ſmall, and moveable: Whereas thoſe which are very large and hard, are attended with great Danger: eſpecially if they are ſeated near to large Veins and Arteries, by Nerves, Tendons, or upon the Joints; or, if they happen in feeble and old People. Hence the Surgeon may judge from the Nature of the Tumor, and Circumſtances of the Patient, whether or no, and by what Means, it is curable.

Cure by diſcuſſing.

IV. With regard to the Cure of theſe Tumors, various Methods are proſecuted. I am not inſenſible, that many Surgeons are for an immediate Extirpation of all encyſted Tumors, without any more Delay: But I am rather inclined, with HIPPOCRATES, firſt, to try them with more gentle Methods of Cure. Whenever I meet with theſe Tumors, as yet ſoft, and of no long ſtanding, I think it every Way more proper to diſperſe, or elſe to ſuppurate them, before the Knife is called in for Aſſiſtance. But on the contrary, when theſe Tumors appear to be very hard, and of long ſtanding, it ſeems moſt proper to refrain from topical Remedies. For thoſe Means are ſo far from ſucceeding in the Digeſtion or Diſcuſſion of ſcirrhous and ſteatomatous Tumors, that they very

very often increaſe them, and ſometimes turn them into a Cancer: Whereas they might have been tolerable in themſelves for many Years, ſo that under theſe Circumſtances we muſt rely altogether on Extirpation. But if the Patient is afraid of the Knife, and will admit no Means but topical Remedies, it may not be amiſs to uſe ſome of the diſcutient or digeſtive Plaſters; of which Sort are *de Ammoniaco*, *de Galbano*, *de Ranis cum Mercurio*. *Diachylon cum Mercurio*, *de Mellilot*. *Oxycroc*. *diaphoreticum* Mynsichti, *Diaſapon*, *&c*. Sculte-tus (in *Obſ*. 87.) aſſures us, he has cured various encyſted Tumors of the *Meliceres* kind with *Ceratum diaſinapios*: But before a Plaſter of that is applied, it is generally adviſeable to anoint the Part firſt with *Balſ*. *Peruv*. *Ol*. *Sapon*. *vel Petroleum*, *&c*. by which Means the Tumor frequently diminiſhes by Degrees, till it be at length diſperſed. To do this the more effectually, a little mercurial Ointment ſhould be well rubbed into the Tumor every Day before a Fire. See more concerning the Diſperſion of ſchirrous Tumors in *Part* I. *Book* IV. *Chap*. XVI.

V. If the Tumor does not diminiſh by the Uſe of diſcutient Applications, you muſt endeavour to bring it to Suppuration[a]; And this more eſpecially when it is of the ſofter Kind, like the *Meliceres* or *Atheroma*. For this Purpoſe the Application of a Plaſter of *Diachylon* with the Gums, and the Repetition of warm emollient Cataplaſms to the Tumor, are extremely uſeful: And the more ſo, if you moiſten the middle of the Tumor every Day with a little ſtrong *Sp*. *Salis Ammoniaci*. When the included Matter has thus acquired a due Softneſs, and the Integuments appear a good deal extenuated, you ought then to open the Tumor by a large Inciſion; and, having diſcharged the Matter with as much as you can of its including Cyſt, the Remainder is to be brought away, by dreſſing with digeſtive or detergent Medicines. For if the Tunics of the Cyſt be not entirely diſcharged, the Tumor generally returns again ſoon after the Wound has been healed. In the Time you are deterging the Abſceſs, it may be proper to apply a *Diachylon* Plaſter externally, to keep the Lips moiſt, and better diſpoſed to unite afterwards. Cure by Suppuration.

VI. But if the Tumor can be neither diſperſed, nor ſuppurated, but continues to enlarge itſelf, 'tis generally in that Caſe moſt adviſeable to make an Extirpation of it, before it grows too large, or degenerates into a cancerous Nature. There are ſeveral Methods in Practice for removing or extirpating theſe Tumors, according to their Size and Nature. Thoſe which are ſmall and hard, or hang by a Root as by a Stalk, are generally beſt removed by Ligature, in the Manner of Warts: By which Means they wither, and fall off of themſelves in a few Days. But the moſt ready and expeditious Method is, to cut them off with a Scalpel, and then to heal up the Wound: But if, in removing them this Way, you divide a conſiderable Artery, you may ſtop it by ſome potential, or even the actual Cautery, or elſe by taking it up with a Needle and Thread. Laſtly, theſe Tumors may be often removed by the Application of cauſtic or corroding Medicines retained about the Root by means of Plaſters, Compreſſes, and Bandage: And when you find the Root of the Tumor almoſt corroded through, the reſt may be divided by the Scalpel. Cure by Extirpation.

VII. If the Root of the encyſted Tumor appears too large for it to be conveniently taken off by Ligature, you muſt then remove it either by the Knife Removal of the larger Kinds.

[a] See Sculte-tus on Suppuration in ſteatomatous Caſes, *Obſ*. *Chirurg*. 93.

or Cauſtics; though the latter is uſually preferred by moſt Surgeons. In order to extirpate it by the Knife, you muſt firſt make a longitudinal Inciſion upon the Tumor: And if that does not appear ſufficient, make another Inciſion acroſs the former, till you think the Wound large enough for taking out the Tumor. In order to this you next dilate the Integuments, and ſeparate them from the Cyſt of the Tumor, by the Aſſiſtance of your Fingers and the Scalpel, by which Means you are to take it out whole, if poſſible. That you may ſucceed the better in the Operation, it will be proper for an Aſſiſtant to dilate the Lips of the Wound, either with Hooks or his Fingers, and to wipe up the Blood as it flows, with a Sponge, that the Surgeon may not be impeded in his Work. When the Tunic, or Cyſt of the Tumor appears, which is uſually pretty white and hard, the Surgeon is then to take hold of, and elevate the Tumor with the Fingers of his Left Hand, if it be ſmall enough: But if it be too large to be thus held and elevated, it may be done by another Aſſiſtant with the Hook, *Tab.* VIII. or the Forceps, *Tab.* XXIII. *Fig.* 1. or elſe he may paſs a crooked Needle and ſtrong Thread croſs-wiſe under the Tumor, and by that Means elevate it, while he circumſpectly frees it from the adjacent Parts; which is generally done with moſt Eaſe in the moveable Kind of theſe Tumors: But in the more fixed, the Taſk is pretty difficult. But in thus freeing the Tumor, the Surgeon muſt be cautious not to injure any important Part that may be contiguous: And if the Tumor, to be extirpated, is either in the upper or lower Extremities, where perhaps a large Artery or Vein is to be divided, in that Caſe the Tourniquet may, and even ought to be firſt fixed upon the Limb. Which Circumſtances being duly obſerved, Tumors of this Nature have been often ſucceſsfully extirpated, of many Pounds Weight, and which have been not only lodged in the fleſhy Parts, but have even adhered to the Bones and Jaws[a].

Treatment after Extraction.

VIII. The Tumor being thus carefully extracted, if the Wound and Hæmorrhage be ſmall, you may preſs the Lips together with your Fingers; and by covering the ſame with Lint and Compreſſes, retained with a proper Bandage, the Patient is generally cured in a few Days time. But in Caſe of a profuſe Hæmorrhage, the Blood is to be ſtopped, either by Ligature, Aſtringents, or the actual or potential Cautery, as we have directed more at large in *Part* I. *Book* I. *Chap.* II.

Removal of Fragments of the Cyſt.

IX. But if by Neglect or Accident the including Cyſt of the Tumor ſhould be broke or wounded in its Extraction, (or induſtriouſly, to ſave the Eye, where it falls on the Eyebrow; or to ſecure the Veins and Arteries in other Parts of the Body) Care muſt be afterwards taken entirely to remove it; otherwiſe the Tumor will ſpeedily return. Indeed if the Tumor be either a *Schirrhus*, *Sarcoma*, *Steatoma*, or a glandular Part, the Contents are hard enough to make a clean Extirpation of it, notwithſtanding its including Coats be wounded. But when the Matter of the Tumor is ſoft or fluid, by its eſcaping, the Tumor will become flaccid, ſo that it will be hardly poſſible to make a clean Extirpation of the Cyſt without leaving ſome Fragments behind; which muſt, in that Caſe, be brought away, by dreſſing the Abſceſs with Digeſtives, and deterging with *Præcipitat. rub. Alumen uſt. Ung. Ægyptiac. &c.* mixed with your digeſtive

[a] See ROONHUYSEN, *Obſ.* I. pag. 4. SCULTETUS *cum notis* TILINGII. PECHLIN, *Obſ.* pag. 542. PETIT *apud* GARENGEOT. *Chirurg.* Tom. II. Cap. *de Tumor. Tunicat.* LE DRAN, *&c.*

Oint-

Ointments: By which means, having cleared the Sinus, you may incarn and heal, as in other Wounds, without the Danger of a Relapse.

X. If you rather chuse to remove Tumors of this Kind by the Use of Caustics, you must, in that Case, apply a Piece of *Lapis infernalis*, *Butyr. Antimon.* &c. upon it, defending the other Parts by a perforated Plaster, as we directed *Chap.* XIX. *Sect.* IV. But, in my Opinion, this is not a safe Practice in those encysted Tumors, which are hard, large, inveterate, and painful, or inclining to be cancerous; for thus you may easily turn a *Scirrhus* into a real Cancer: And even in others, 'tis hardly possible thus to erode them quite away without inducing violent Pains, Fever, Hæmorrhage, and other malignant Symptoms, to the Hazard of the Patient's Life. It is therefore, in the general, much better to have Recourse to the Knife for the Removal of these Tumors, when they are large and hard, notwithstanding we now and then meet with an Instance of their being successfully extirpated by Caustics [a]. But if the Tumor appear soft, and yielding, like the *Atheroma* or *Meliceris*, in that Case, I frequently apply a Caustic, so as to make a Way through the Integuments, and Cyst: Or else dividing them by an Incision in the Middle, I discharge their Contents, and then deterge and incarn, as in other Abscesses; which last Method I take to be milder than an Incision, and Extirpation of the Cyst by the Scalpel. See Le Dran on the Treatment of a *Meliceris* above the Knee. Use of Caustics in these Tumors.

CHAP. XXIX.

The Method of extracting foreign Bodies *from* Wounds.

I. WE meet with very little in the antient Systems of Physic and Surgery concerning the Extraction of Bullets, which may possibly be, in some Measure, owing to their not being so much in Use, or at least not so fatal formerly as now. We indeed read in Celsus [b], that leaden Balls were used by Soldiers in War before the Birth of Christ: But then I suppose they were only flung by Slings or Bows, the destructive Powder being at that Time unknown. For the same Reason we also meet with no Directions for extracting Fragments of Bomb or Granade Shells, which are of a later Invention: But then they are more large in the Methods of removing the Ends of Darts, Spikes, Arrows, Swords, and such like Weapons. And though, at this Time of Day, Arrows are hardly ever used but among barbarous Nations, yet it may not be here improper to give brief Directions for their Extraction, if they should chance to come under the Surgeon's Care. In doing this, we shall find that almost the whole Business consists in drawing out the Head, so as that its protuberant Beard or Hooks may not wound and lacerate the contiguous Parts. If it appears to be lodged but superficially under the Integuments, it will be best to draw it out the same Way it entered, provided you first dilate the Wound sufficiently by Incision, rather than give Occasion for any of the adjacent Parts to be lacerated: Otherwise it may be thrust forwards, and drawn out in the Direction

[a] Of extirpating scirrhous Tumors in the salival Glands, and those of the Neck and Breast, we shall treat hereafter in particular Chapters.

[b] *Lib.* VII. *Cap.* 5.

rection of its Point in the oppoſite Side, having firſt made an Inciſion to meet it. This laſt Method is moſt eligible, when the Weapon has deſcended very deep, ſo that there is much leſs Space for it to paſs onward, than to be drawn back again; and alſo when it has paſſed beyond any large Blood-veſſels, or Nerves, ſo that it would induce a Laceration of them, to draw it back: And therefore, to avoid them, it muſt be thruſt forward through an Inciſion made in the neareſt and moſt convenient Part of the oppoſite Side. The Method of extracting the Ends of Spikes, Swords, Sticks, or the Fragments of Glaſs, Paper, Clothes, *&c.* you may find in *Part* I. *Book* I. *Chap.* I. *Sect.* XXXIII. and, in the third Chapter following, you will find the Method of extracting Bullets and Grains of Gun-powder, in Gunſhot-wounds. Laſtly, if any of theſe foreign Bodies have ruptured a large Blood-veſſel in the upper or lower Extremities, ſo as to excite a profuſe and dangerous Hæmorrhage, it will, in that Caſe, be immediately neceſſary to apply the Tourniquet upon a convenient Part of the Limb, before you ſearch for the Body; which being extracted, the next Step is to ſecure the ruptured Veſſel, and dreſs the Wound.

CHAP. XXX.

Of SUTURES *of* WOUNDS.

The Kinds and Uſes of Sutures.

I. THERE are two Kinds of Sutures uſed by Surgeons in Wounds: The firſt is made with a Needle, and diſtinguiſhed by the Name of the *true* and *bloody Suture*; the other is made by the Application of ſticking Plaſters, and is termed the *dry* or *falſe Suture*. Sutures are not to be uſed indifferently in all Wounds: But in thoſe chiefly, in which the Lips cannot be cloſely approximated by Deligation: As in many of the tranſverſe, oblique, or angular Wounds, which have been lately inflicted, are quite free from any foreign Bodies, and are not attended with any Loſs of Subſtance. In moſt of theſe a Suture will be of great Service, not only by expediting the Healing, or Union of the Wound, but alſo by procuring a ſmaller and neater Cicatrix. The dry Suture is uſed chiefly in ſuch Wounds as are ſuperficial, of no great Depth or Length, and particularly for thoſe inflicted on the Face. Though even in theſe there are ſome Surgeons, who prefer and make the true Suture. But I think the different Circumſtances and Diſpoſitions of Wounds may very well direct the Surgeon, ſometimes to one, and ſometimes to the other Kind of Suture: For what need is there of ſtitching up a Wound, whoſe Lips may be well approximated, and retained together by Plaſter and Bandage? I think the Needle ought, in ſuch Caſes, to be ſpared, both for the Eaſe of yourſelf, and the Patient. But on the contrary, in large and deep Wounds, where the Lips cannot be cloſely retained by Plaſter and Bandage, or in thoſe where the Part is almoſt amputated, or hangs by a little bit, as in the Noſe, Ears, Cheeks, Chin, Forehead, Fingers, *&c.* there you ought immediately to conjoin the Lips by Suture with Needle and Thread.

Directions for Sutures.

II. As we have already ſufficiently explained the Method of making Sutures in Wounds (in *Part* I. *Book* I. *Chap.* I. *Sect.* XXXIX. *& ſeq.*) we ſhall here only add a few neceſſary Cautions: As, 1. That you ought always to ſhave the Hair

of the Part clean off, with a Razor, before you attempt to conjoin the Lips of the Wound by dry Suture, with ſticking Plaſters. 2. That when one Plaſter does not well retain the Lips, you muſt apply ſeveral, either by the Side of, or acroſs each other, as in *Tab.* IV. *Fig.* 4, 5, 6. You are alſo to obſerve, 3. That the true Suture with Needle and Thread is of two Kinds, Simple and Compound: The firſt of which comprehends the *knotted*, the *Glovers*, and *circumvoluted*, and the *Suture* of the Tendons. And, among theſe, the firſt is ſo called from its diſtinct Knots, *Tab.* IV. *Fig.* 16. the Glovers from its Reſemblance to the Suture uſed by theſe Artiſts, and by the Surgeon for Wounds of the Inteſtines, *Tab.* IV. *Fig.* 20. The circumvoluted Suture is, when the Thread is wound about the Needle, after it has been entered through both Lips of the Wound, as in *Tab.* IV. *Fig.* 21, 22. for the Hare-Lip: In treating of which we ſhall deſcribe it more particularly. The Suture of a Tendon is alſo of a particular Kind, as we ſhall deſcribe in our Chapter of uniting divided Tendons, by this Means, in the End of our Operations. Beſides theſe now mentioned, there were various other Sutures uſed by the antient Surgeons, as the *Sutura Sartoria*, *Sutura Celſiana*, *& Clavata*, the laſt being made upon Quills or cylindrical Sticks, as in *Tab.* IV. *Fig.* 19. But we ſhall not inſiſt upon a particular Deſcription of theſe, which have been long out of Uſe: Only we may obſerve, that the *Sutura clavata* has been lately revived, and recommended with a little Variation, by PALFYN and GARENGEOT; who, inſtead of Sticks or Quills, uſe a bit of Silk ſpread with Cerate, and rolled up into a Cylinder. 4. Laſtly, you muſt obſerve, that, in the Suture of deep Wounds, it is frequently neceſſary to introduce a Tent, and leave it at the Bottom of the Wound, till its Fundus appears well deterged, that you may heal it from the Bottom upwards.

CHAP. XXXI.

Of ſeparating ADHESIONS *betwixt the* FINGERS *and* TOES.

Adheſions of the Fingers together.

I. WE frequently meet with new-born Infants, having ſeveral of their Fingers or Toes cohering, or grown together, either by a ſtrict Adheſion of their Fleſh, or elſe only by looſe Productions of the Skin, as in the Feet of Ducks and Geeſe. Though the ſame Diſorder is alſo ſometimes found in Adults, when their Fingers or Toes have been neglected, after an Excoriation of them in Burns or Wounds: To be freed from which Malady, the Patient is deſirous of invoking the Surgeon's Aid, partly to be rid of the Deformity, but chiefly to recover the proper Uſe of the Fingers. Theſe Adheſions may be ſeparated in a two-fold Manner, according to the Nature of the Diſorder, *i. e.* either by cutting out the intermediate Skin with a Scalpel, or Pair of Sciſſors, or elſe barely by dividing them from each other with thoſe Inſtruments when they cloſely adhere. But to prevent their Coheſion again for the future, you muſt inveſt each of the Fingers ſeparately with a ſpiral Bandage about an Inch broad, and dipt in *Aq. Calcis cum Sp. Vini*, according to the Figure in our laſt, or, XXXIXth *Plate*, on Bandages.

II. Some-

Or with the Palm of the Hand.

II. Sometimes the Fingers, inſtead of adhering to each other, grow to the Palm of the Hand, as I have more than once obſerved from Wounds or Burns; ſo that they cannot by any means be extended, or drawn back to open the Hand. For the Sake of Beginners, I ſhall recite the Method, by which I cured three of theſe Patients. Firſt, I careſully ſeparated the Fingers from their Adheſions with the Palm, without injuring their Tendons, and, after dreſſing them with vulnerary Balſam, and ſcraped Lint, I extended them on a Ferula of thick Paſteboard, in which extended Poſture I treated the wounded Fingers ſeparately, till they were healed. But at every Dreſſing you ought to move the Fingers gently, to prevent a Rigidity, or Stiffneſs of their Joints.

CHAP. XXXII.

Of amputating DISEASED *and* SUPERFLUOUS FINGERS.

INFANTS are ſometimes born with ſupernumerary, mis-ſhapen, and miſplaced Fingers, of various Kinds, ſome with Nails and Bones, and others without, reſembling fleſhy Excreſcences. When the Deformity or Incumbrance of theſe make their Amputation neceſſary, it may be conveniently enough performed, either by the Scalpel, or a Pair of Sciſſors; eſpecially when there are no Bones in them: For if there are Bones, you muſt amputate with a ſtronger Pair of Sciſſors for the Purpoſe, able to cut through the Bones. If there are ſeveral of theſe Fingers, and the Infant appears too weak or infirm, to have them all amputated at one Time, it is beſt to take them off at ſeparate and convenient Intervals, intermitting a few Days, ſo as to amputate the next, when the preceding is near well. The Hæmorrhage may be ſtopped with dry Lint and Compreſſes, or ſuch as have been dipt in *Sp. Vini*, and the Wound next healed with ſome vulnery Balſam, as in others. In the Year 1718, I cured an Infant of three Weeks old, after taking off a ſuperfluous long Finger, which grew to the Thumb, which had a long Bone, and a Sort of Spur like that of a Cock, inſtead of a Nail; ſee *Tab.* XII. *Fig.* 15. I proceeded, firſt, by making an Inciſion through the Skin all round it with a Scalpel, and then cut through the Bone with a ſtrong Pair of Sciſſors. This done, I ſtopt the Hæmorrhage, which was inconſiderable, with Lint dipt in *Sp. Vini*, and a cloſe Bandage; and the Wound was afterwards ſpeedily healed with vulnerary Balſam. I could recite many more Cures of the ſame Kind made by myſelf: But as the Method uſed was the ſame in all, they are not here neceſſary to be mentioned, ſince this alone will ſuffice.

CHAP.

CHAP. XXXIII.

Of amputating ſphacelated FINGERS *and* TOES.

I. FINGERS and Toes are uſually amputated by the Surgeon, chiefly upon three Accounts; 1. When they are ſo contuſed and ſhattered by Bullets or other Inſtruments, that they cannot be reſtored and preſerved: 2. When they are ſphacelated, or totally mortified, either from Cold, Contuſions, or other Cauſes: And, laſtly, 3. When they become carious, cancerous, or ſchirrhous, ſo as to be curable by no Remedies or Applications whatever, as I have met with frequent Inſtances. Nor is it uncommon for the Fingers of Maſons, Carpenters, and other Labourers, to be accidentally cruſhed, ſo as to make an Amputation of them unavoidable. See ROONHUYSE, *Obſ. Chirurg.* 25. When it is neceſſary to amputate Fingers and Toes.

II. Before the Surgeon proceeds to amputate Fingers or Toes, he ought to be firſt well aſſured, that there is no Poſſibility of preſerving them ſound and entire. Therefore if they appear to be but ſlightly cruſhed, or only beginning to be infeſted with a Gangrene, he ought to treat them with diſcutient and ſpirituous Applications, to prevent the Diſorder from ſpreading itſelf; at the ſame time reducing and retaining the bony Fragment by his Fingers, and Deligation, as in other Fractures. But if they are ſo violently cruſhed as to hang but by a little bit, I know no great Reaſon why they ſhould not be immediately taken off, either by the Sciſſors or Scalpel; as they alſo ſhould when any one Joint is completely ſphacelated; for Delays are, in thoſe Caſes, frequently very dangerous. But if any of the Fingers or Toes ſhould be cut off by any ſharp Inſtrument, ſo as to hang by a bit, the Wound being recent, though large, you ought not to take off the pendulous Part, but replace it immediately, ſecuring it well by Plaſter and Deligation, and this even when the Part is cut quite off, but obliquely. For I knew an Inſtance of a Butcher's Finger that was cut quite off obliquely, but being immediately fixed, and retained in its proper Place by Deligation with a Linen-rag, it adhered, and became well without any other Medicines. At leaſt, it is always beſt to try, if it will not adhere before you cut it off, and reject it; ſee *Chap.* LXXII. following. Cautions to be firſt obſerved.

III. The Manner of amputating is chiefly threefold: Either 1. by a Pair of ſtrong *Sciſſors*[a], or rather ſharp-edged *Pincers*, treating the Wound as we before directed in the preceding Chapter: Or, 2. by the *Mallet* and *Chiſel*, *Tab.* XII. *Fig.* 17. with which the vitiated Parts are taken off at one Blow, as I have frequently done in cancerous Affections with a Caries or *Spina Ventoſa* in the Fingers: And ROONHUYSE has alſo thus ſucceſsfully amputated the great Toe, being ſcirrhous, notwithſtanding what others may ſay againſt this Method. Or, laſtly, 3. the diſeaſed or mortified Parts are amputated by dividing in the next ſound Joint with a *Scalpel*, leaving or drawing back a large Part of the Skin, to Method of amputating.

[a] See PARÆUS, *Book* XVI. *Ch.* 30. SCULTETUS *Plate* LIII. *Fig.* 2. But by this Method the Bones are often ſplintered, or the nervous Parts lacerated; from whence ariſe dangerous Inflammations and Abſceſſes, and too frequently a Caries is the Conſequnce. DOUGLAS abſolutely rejects the Forceps, the Mallet and Chiſel, *Operat. Chirurg. Syllab.* p. 45.

wrap over the Stump, that it may heal the ſooner. This laſt Method of amputating, is preferable to the former, in that you are, by this means, certain to avoid any ſupervening Caries, or a ſplintering of the Bone: For which Reaſons I have uſed it with Succeſs for removing Thumbs and Fingers, even of old People, in the Articulation of them with the Metacarpus, when they have been totally deſtroyed by a Caries or Mortification. Some indeed imagine this Method of amputating in the Joint to be not ſo convenient, becauſe a Cicatrix or Skin cannot be induced over the Cartilage. This is, however, an Obſtacle that I never yet met with, and may, at worſt, be eaſily avoided by drawing back and leaving a large Part of the ſound Skin on, and by removing the cartilaginous Extremity of the metacarpal or metatarſal Bone; by which means the Bone and Skin will more intimately unite and adhere. After the Amputation your Dreſſings muſt be made with ſcraped Lint, Compreſs, and Bandage, as we before directed. And, if the Patient be plethoric, in order to prevent Inflammation, or a future Hæmorrhage, it may be proper to take a few Ounces of Blood from a Vein. If any of the two foremoſt Internodes of the Fingers, ſhould appear to be carious, and Part of the third, it is better to amputate the vitiated Part of the laſt by the Mallet and Chiſel, which will more expedite the Cure, than to take off the whole Finger cloſe to the Metacarpus by the Scalpel. But if the whole Finger or Toe is entirely corrupted, it muſt then be taken off in the Articulation cloſe to the Metacarpus, leaving a good deal of the Skin. See Inſtances of great Toes amputated in LE DRAN, *Obſ.* 112, 113, and 114.

An EXPLANATION *of the* TWELFTH PLATE.

Fig. 1. Repreſents the Cupping-glaſs uſed at preſent in *Germany*, and elſewhere, for dry Cupping, or for extracting Blood after Scarification.

Fig. 2. Is the Scalpel, or Scarificator, commonly uſed by our *German* Cuppers. A the Handle, B the Edge, C the Part which is ſtruck extremely quick by the Finger, ſo as to make the Edge wound the Skin.

Fig. 3. Repreſents the Order or Poſition of the little Inciſions made in the Skin by the Cupper, that they may all be cleanly covered by the Cupping-glaſs, *Fig.* 1.

Fig. 4. Exhibits the modern cubical Scarificator, making ſixteen Inciſions in the Order of *Fig.* 3. by one Stroke upon the Skin, and with very little Pain.

Fig. 5. Gives the Form or Shape of a Leech, for the Information of ſuch as may be ignorant of that Inſect: A the Mouth or Head by which it bites, B the Body and poſterior Parts. But it muſt be obſerved, that one and the ſame Leech may, by differently contracting and expanding itſelf, appear in a hundred Shapes, ſo that its Length and Thickneſs are very uncertain.

Fig. 6. Is the Needle uſed by the Inhabitants of *China* and *Japan* for making their Acupuncturation, which they celebrate in moſt Diſorders, as we do Phlebotomy. A the Handle, B the Point which enters the Fleſh.

Fig. 7. Is the little Hammer uſed to ſtrike in the preceding Needle: A the Head of this Hammer, B its Handle, CC a Caſe in the latter to depoſite the Needle in.

Fig. 8. Repreſents the actual and concealed Cautery, uſed formerly for the making of Iſſues, and is, by ſome, denominated *Capſula Caſſeriana*. A denotes the End of the actual Cautery, or red-hot Iron, protruding itſelf beyond

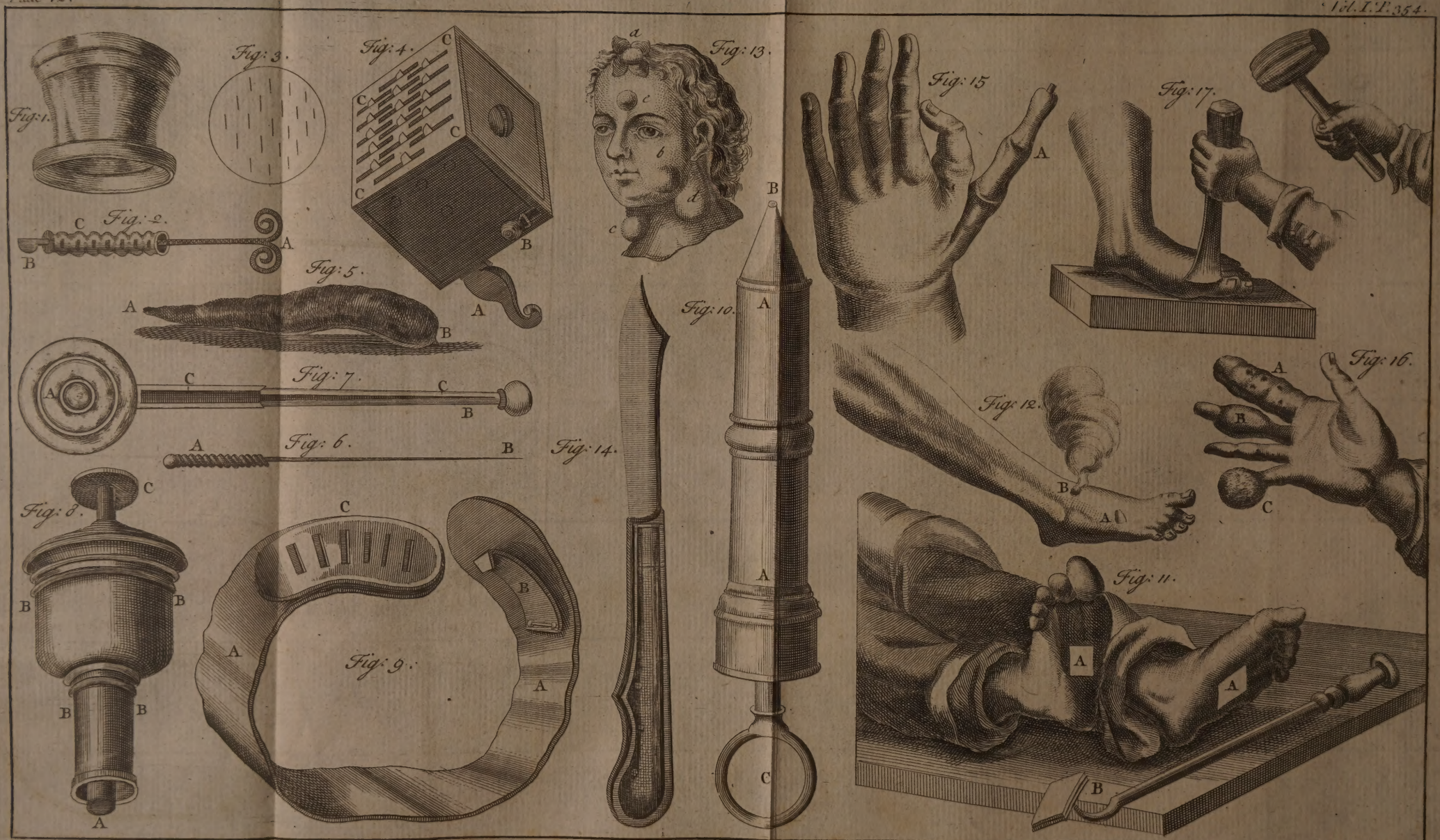
Fig: 1.
Fig: 2.
Fig: 3.
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Fig: 9.
Fig: 10.
Fig: 11.
Fig: 12.
Fig: 13.
Fig: 14.
Fig: 15.
Fig: 16.
Fig: 17.

yond the Case. B B is the wooden Case concealing the red-hot Iron from terrifying the Patient. C the Handle, by depressing which, the Cautery is forced into the Skin.

Fig. 9. Is a Machine to be used instead of Deligation for Issues in the Arm, to be made a little longer for those in the Neck, Leg, or Thigh. A A is a leathern Swath of about two or three Fingers Breadth. C C is a Brass-plate with several oblong Appertures, for intercepting the Hook B of the other Plate in the Manner of a Clasp.

Fig. 10. Shews the Syringe proper for injecting Liquors into the Urethra of Males, and the Vagina of Females, for various Uses. A A the Body of the Syringe, B its Extremity, ending with an obtuse Point instead of a small Tube, to prevent the injected Liquor from regurgitating and flying about. C the Ring or Handle of the Sucker, by which the Liquor is drawn into, and forced out of of the cylindric Body.

Fig. 11. A A Shews the Parts of the Soles of the Feet, which the *Italian* Physician MISTICHELLIUS directs to be cauterized in Apoplexies, B the Square Iron Cautery for the Operation, which in that Disorder, he says, is highly serviceable.

Fig. 12. Represents the Method of burning the Part affected in the Gout with the *Indian Moxa*. A denotes the Cone of *Moxa* not yet fired, and B one that is burning.

Fig. 13. Gives a View of several encysted Tumors *a b*; of schirrhous Glands in the Neck *c d*; and of a fleshy Excrescence or Mark from the Mother, *e*.

Fig. 14. Represents the small Scalpel, which I generally use for extirpating schirrhous Tumors, or Glands in the Neck, Wens, or even schirrhous Glands of the Breasts.

Fig. 15. Represents the Hand of an Infant with six Fingers: In which A denotes the superfluous Finger with a Nail like a Cock's Spur, which I took off by a Pair of amputating Sciffars or Pincers. This Instrument I also use in a *Spina ventosa*, or Caries of the Fingers.

Fig. 16. Is a Hand with a whole Index, A, carious, which I amputate close to the Metacarpus by the Scalpel *Fig.* 14. But then I also remove the Head of the first Phalanx, that the Wound may heal the sooner. B denotes a *Spina ventosa* in the middle Finger, and in the second Internode, which I amputate in the first Bone or Phalanx; C is a large Excrescence or Protuberance at the End of the little Finger, from the same Disorder, which I amputate in the second Bone, both of them by the Mallet and Chissel.

Fig. 17. Shews the Method of amputating the great Toe with the Mallet and Chissel, used by ROONHUYSE.

CHAP. XXXIV.

Of amputating the HAND, CUBITUS, *and* HUMERUS.

I. THOUGH the Amputation of Arms and Legs is indeed, with some Reason, commonly esteemed one of the most terrible and severe Operations in Surgery, yet there are many Cases that occur daily in Practice, in which

In what Cases Amputation is necessary.

the Operation is absolutely necessary and unavoidable, in order to save the Life of the Patient. Such as, 1. When the Muscles of the Part or Limb are sphacelated[a]; 2. Or when the Muscles and Bones are most violently contused and shattered; 3. When there is an incurable Caries, or *Spina ventosa*[b]; 4. When the brachial, crural, or other large Artery, is either totally divided[c], or else wounded, so as to bleed incessantly without any Possibility of stopping the Hæmorrhage but by Ligature; in which Case 'tis hardly possible to preserve the Limb from mortifying, or save the Patient's Life without Amputation. 5. And, lastly, this Operation is necessary in those Tumors of the Hand and Arm, which arise from a *Spina ventosa*, or some other irremediable Cause, the Patient being tortured with the most excruciating Pains, as described by M. A. SEVERINUS[d], BIDLOE[e], RUYSCH[f], &c. In the mean time I would advise all prudent Surgeons, not to perform this Operation without there are other skilful Surgeons or Physicians, who also advise it, or think it necessary; by which means he may avoid many reflections, which are often unjustly thrown upon a Surgeon without such Precaution.

Method of amputating the Hand.

II. To proceed regularly with Amputations in the upper Extremities, we shall begin with that of the Hand; which may, on some Occasions, be amputated, in the Manner of the antient Surgeons, by one Blow with the Mallet upon a sharp Chissel fixed near the Carpus, as the Operation is represented in *Tab.* LIII. of SCULTETUS, *Edit. An.* 1666. But in reality this Method is often found to be not only unsafe, but even of dangerous Consequence, by violently contusing or fracturing some of the Bones and Parts in the Carpus. It is therefore not without Reason that the Moderns reject this Practice for that with the Knife and Saw; with which they take off the Hand more slowly indeed, but more securely, provided the Saw be not used to the Carpus or Metacarpus: Because the numerous Ligaments, Tendons, and small Bones there seated, cannot safely be divided by the rough Teeth of that Instrument. [g] The Practice of the modern Surgeons is therefore here much the best, who amputate the Hand by the Knife and Saw, cutting through the Bones of the Cubitus, as will presently appear.

What is to be observed in amputating the Arm.

III. When the Hand, Cubitus, or Humerus, are required to be amputated upon the Account of some incurable Sphacelus, Caries, or other Disorder, there are then two Things chiefly necessary to be observed. The first of these is the *Place where* the Amputation must be made, which must at least be one[h] or two Fingers Breadth above the mortified Part, never in the diseased Part it-

[a] See *Part* I. *Book* IV. *Chap.* XIV. preceding.
[b] See *Part* I. *Book* V. *Chap.* VIII, IX. preceding.
[c] I have frequently stopped profuse Hæmorrhages from the brachial Artery by Ligature, and therefore it will not be so often necessary to amputate the Arm on that Account, as many Surgeons imagine and direct.
[d] *Lib. de Abscess.*
[e] *Exercit. Medic. Chirurg.*
[f] *Epist. Anatom.* Problem XIV.
[g] Yet there have been some Surgeons who have, in this Manner, amputated the Hand by the Saw in the Carpus or Metacarpus, as we learn from SCULTETUS, *loc. cit.* Nor is it impracticable, in my Opinion, to amputate the Hand in its Articulation with the Cubitus by the Scalpel, as in the preceding Chapter; though I must acknowledge myself to have never yet made the Experiment.
[h] FABRICIUS AB AQUAPEND. L. I. *Pentateuch. Chirurg. & Operation Chirurg, tit. de Sphacelo,* & SCULTETUS *in Explic. Tab.* LIII. are both of Opinion, in Opposition to HILDANUS, that the sphacelated Limb should be taken off in the diseased Part, near the sound; and what remains unsound,

self.

ſelf. Nor ought theſe larger Kinds of Amputations to be ever made in the Articulations: For (beſides other Difficulties) there being no Fleſh there to cover the Ends of the Bones, it will be almoſt impoſſible to heal the Stump [i], or prevent a Caries in the Head of the Bone, with other bad Symptoms. The next Thing required after the proper Place for Amputation is aſſigned, according to the uſual Method, is (2.) *the Proviſion and Preparation of the ſeveral neceſſary Inſtruments* and Parts of the Apparatus, which are to be laid in readineſs upon a large Plate, or convenient Part of the Table; yet ſo as that they may be concealed from the Patient's View, who might be not a little terrified and diſheartened by them.

IV. For the Sake of Beginners, we ſhall here enumerate the ſeveral Inſtruments neceſſary to compoſe the Apparatus for this Operation. Theſe are, (1.) the *Tourniquet*, before deſcribed in *Part* I. *Book* II. *Chap.* II. *Sect.* IX. *& ſeq.* (2.) Some Ligatures, or Tapes, of a Finger's Breadth, and about an Ell and a half long. (3.) A middling-ſized Knife (*Tab.* XIII. *Fig.* 1.) for dividing the Skin, to draw it back. (4.) A larger Scalpel, or Knife, of a crooked Figure (*Tab.* XIII. *Fig.* 2.) for dividing the Remainder of the Fleſh. (5.) A Catlin, or double-edged Scalpel (*Fig.* 3.) for dividing the intermediate Fleſh betwixt the Ulna and Radius. (6.) A Piece of Linen Cloth about three Spans long, and ſix Fingers Breadth, ſlit up lengthwiſe about half-way, as in *Tab.* II. *Fig.* 17. (7.) A well-tempered and ſharp Saw [k] (*Tab.* III. *Fig.* 4.) for dividing the Bones. (8.) A Pair of Pliers, or Forceps to hold the Ends of the Arteries, (*Fig.* 5 and 6.) (9.) Some crooked Needles, armed with ſtrong Thread, or ſome Bits of blue Vitriol wrapped up in Lint or Cotton. (10.) Some ſmall ſquare Compreſſes, (*Tab.* II. *Fig.* 21.) (11.) A large Quantity of ſcraped Lint. (12.) Some aſtringent Powders, to ſtop the Hæmorrhage, or rather, as the former frequently inflames the Parts and impedes the Suppuration, provide ſome *Alcohol Vini & Oleum Terebinthinæ*, in proper Veſſels, though in reality we may well enough omit all of them. (13.) A large Bolſter of fine Tow, of a round Figure, and broad enough to cover the Stump, and retain the other Dreſſings: Or, inſtead of this, a Piece of the Fungus called *Lupi Crepitus*, or Puff-ball, of the like Size and Figure. (14.) A Calf's or Swine's Bladder, or elſe a large ſticking Plaſter cut in the Form of a *Malta* Croſs, (*Tab.* II. *Fig.* 15.) or three ſeparate Plaſters, two Spans long and two Fingers broad, for inveſting and ſecuring all the other Dreſſings on the Stump. (15.) A Compreſs in Form of a *Malta* Croſs, but larger than the Plaſter. (16.) A thick ſquare Compreſs, to inveſt the End of the Limb. (17.) Three other Compreſſes of two Spans long and two Fingers Breadth. (18.) A Roller or Bandage for the Deligation of the whole, of about five Ells long and three Fingers Breadth. Laſtly, (19.) Some Wine, and other cordial Medicines, to aſſiſt and relieve the Patient in caſe of a Deliquium.

The Inſtruments and Apparatus required.

be removed by the actual Cautery. This they recommend as the ſafeſt and eaſieſt Method. But this Method is now rejected, on many Accounts, by the unanimous Conſent of all modern Practitioners.

[i] But if a ſufficient Portion of the Skin be left on to cover the Stump, it may perhaps heal as readily as the Stumps of Fingers thus amputated.

[k] The Moderns have invented other Saws and Knives for Amputating, as may be ſeen in GARENGEOT's *Tract. de Inſtr. Chirurg.* But theſe here deſcribed being equally as good in all Reſpects, I ſhall not inſiſt on them.

V. The

Position of the Patient, Assistants, and Surgeon.

V. The whole necessary Apparatus being thus provided, the next Business is for the Surgeon to dispose the Patient, Assistants, and himself in a proper Posture to begin the Operation. First, therefore, the Patient must be fixed on a low Chair or Stool, in the midst of the Room, the Surgeon standing betwixt his Legs, and six Assistants at least around him. One of these should stand behind the Patient to hold his Body; another on the Side of the affected Arm, which he is to hold fast by grasping the upper Part of the Cubitus: A third Assistant must hold the Hand, about to be amputated; and a fourth should stand on one Side with the Apparatus of Instruments, to hand them as they may be wanted by the Operator. A fifth Assistant must stand ready with the several Dressings, Compress and Bandage, necessary to complete the Deligation; and the sixth or last should be at Liberty to assist the Patient and Operator occasionally, in handing Wine, Cordials, or any other thing they may want.

What must be done immediately before the Amputation.

VI. Things being thus far advanced, the Surgeon, who should have a Napkin before him, to wipe his Hands when there may be Occasion, proceeds to fix the Tourniquet (*Tab.* III. *Fig.* 1. K) moderately tight about the Patient's Arm, in the Manner we before directed (in *Part* I. *Book* I. *Chap.* II. *Sect.* IX. *& seq.*) by which Means the brachial Artery will be compressed, so as to prevent any profuse Hæmorrhage: And the Nerve being also a Partaker of the same Stricture, will make the Patient less sensible of Pain from the Operation. But to prevent the Tourniquet (*Tab.* III. *Fig.* 1. K) from coming loose, the Turnstick must be held fast by the Assistant standing behind the Patient. But if you apply the Screw-Tourniquet, figured in *Tab.* V. and VI. they will adhere tight upon the Part, without being held by an Assistant. This done, the Assistant holding the upper Part of the Arm, should next draw the Skin strongly upwards, while the Surgeon applies the Tape tight, and circularly about the Part, a little above where it is to be divided, in order to secure the fleshy Parts close to the Bones, that they may be cut through more easily and evenly. Some, as VERDUYN, use a Leathern Strop with a Clasp, instead of a Tape or Fillet, for this Purpose, which we shall consider in *Chap.* XXXVI. *Sect.* III. following. The Surgeon now encourages his Patient with Expressions of Comfort, and with Wine, or Cordials, before he enters on the Operation.

The Operation itself described.

VII. The Operation itself is next begun by an annular Incision made through the Skin, by the Surgeon, with a small Scalpel, the Arm being extended in a parallel or even Direction, by the Assistants: One of which is then ordered to draw the Skin upward as much as possible. The Surgeon next divides the Flesh, down to the Bones, all round, close by the Margin of the retracted Skin with the large crooked Scalpel (*Tab.* XIII. *Fig.* 2.) by which Procedure the Skin will wrap over the Stump, and the whole will be healed a vast deal sooner than by the Method formerly used. The Surgeon now takes the Scalpel, with which he divided the Skin, or else the double-edged Catlin, *Fig.* 4. and therewith cuts through the Flesh and Ligaments betwixt the Ulna and Radius; thereby also separating the Periosteum from the Bones where the Teeth of the Saw are to pass, to avoid violent Pain and Inflammation from a Laceration of that nervous Membrane by the rough Teeth of the Instrument. This is no sooner done, but the Assistants draw back the incised Flesh above and below, to open a Passage to the Bones. And that the Flesh above may be draw up as much as possible, to cut off the Bone higher than the Incision, you

muſt apply the ſlit Piece of Linen [a] (mentioned before at *N.* IV. 6) ſo that its Heads being pulled upward by the Aſſiſtant who holds the ſuperior Part of the Arm, he ſtrives to elevate the Fleſh, that the Bone may be taken off as high as poſſible, by which means the Stump will be more eaſily and neatly covered, and the Wound much ſooner healed. The Surgeon muſt fix his Saw in this Operation, ſo that it may work upon both the Bones of the Cubitus at the ſame Time: Without which Caution, he will be liable either to cut one of them longer than the other, or elſe occaſion a Fiſſure or Splintering of the ſingle Bone, when it becomes ſo far divided as not to be able to bear the Streſs of the Saw. He muſt alſo move the Saw gently at the beginning, till it is well entered: and then he may go on faſter, but with Diſcretion: And to prevent the Saw from being pinched or obſtructed in Motion by the Bones, the Aſſiſtant who holds the ſuperior Part of the Arm ſhould a little elevate the ſame, as the Hand ſhould be a little depreſſed by the other Aſſiſtant, ſo as to make a Space large enough for the Saw to move freely: But this muſt be done gently and cautiouſly, for fear of breaking the Bones. And thus in one Minute or two the Amputation may be completed.

VIII. When the Surgeon has thus amputated the Hand with Part of the Cubitus, his next Buſineſs is, to make a ſtrict Compreſſure and Deligation upon the larger Arteries to ſuppreſs the Hæmorrhage. But the better to diſcover the divided Arteries, the Surgeon muſt order the Aſſiſtant who holds the Tourniquet to relax the ſame a little: Or, if it be the Screw Tourniquet, *Tab.* V. or VI. he may looſen it a little himſelf; by which means the Blood ſtarting from the Arteries, will ſhew their divided Orifices. If the Patient be plethoric, the Surgeon may be leſs ſparing of the Blood at this Time, which muſt be received by a proper Veſſel on the Floor: But in Caſe of Weakneſs, the Tourniquet muſt be inſtantly tightened again, to reſtrain the Flux. When the Cubitus is divided very low, near the Carpus, there will not be any great Occaſion to ſecure the Arteries by a Ligature with Needle and Thread: Becauſe the two or three Branches which run there, are but ſmall, and may be well enough ſecured by Compreſſes of Lint with ſome Bits of *Vitriol. Roman.* or only by ſquare Linen Compreſſes [b]. But the Fleſh and Ends of the Bones are to be well ſecured and inveſted with Doſſils of dry Lint; over which again fix a large Piece of the Fungus called *Crepitus Lupi*, with or without a large Bolſter of Tow, to be ſecured and retained on the Stump by a wet Bladder, or a Plaſter cut in the Shape of a *Malta* Croſs. Or, inſtead of a Plaſter in that Form, you may more advantageouſly apply two or three long and narrow ones acroſs each other, in the Form of a Star, upon the Stump; by which the Skin may be drawn down, ſo as to cover the Wound, and procure a ſpeedy Cicatriſation [c]. Over the Plaſters you are again to place a large Compreſs in Form of a *Malta* Croſs, ſo

Treatment after the Operation.

[a] Some Surgeons uſe a thin Plate of Steel to elevate the Fleſh, inſtead of this Piece of Linen.

[b] M. CHABERT, in his *Obſ. Chirurg. Pariſ.* 1724, aſſerts the Application of Vitriol to be here unneceſſary: Since the Blood may be ſecurely ſtopped, and the Arteries compreſſed, by properly diſpoſing Linen or Lint formed into Doſſils or Compreſſes about the Ends of the Veſſels; ſecuring them by a cloſe Deligation or Bandage: Which, in weak Patients, I have found to ſucceed very well. Others think the Application of Cauſtics both unſafe and injurious, becauſe the Eſchar formed by the Vitriol frequently recedes or ſeparates from the Veſſel, and excites a profuſe Hæmorrhage. *V.* RUYSCH *Epiſt. de nova Methodo Amputandi, &c.*

[c] This Method LE DRAN highly recommends, *Obſ. Chirurg.* Tom. II. p. 309.

that

that it may closely invest the End of the Limb, where it should be held by an Assistant while the Ends are brought up and applied round the Arm. And lastly, you must fix first, one large square, and then three long and narrow Compresses upon the Stump, so that the last may intersect each other in Form of a Star, and come up towards the Humerus. Then you finish the Deligation with a long Roller in the Manner we shall direct at large, in treating of Bandages for the Arm.

The Hæmorrhage sometimes suppressed by the actual Cautery, or Ligature.

IX. Most of the antient, and not a few of the modern Surgeons, approve of the actual Cautery for restraining the Hæmorrhage from the divided Arteries. This Practice is deservedly rejected by the most expert Surgeons of the present Time; not only for the severe Torture it gives the Patient, but because it is at best very suspicious, and even dangerous, especially in Amputations of the Humerus or Femur: For the Eschar formed by the Cautery very often separates in two or three Days time from the End of the Vessel which is stopped, and thereby occasions a profuse, if not a fatal Hæmorrhage. However, the Use of the Cautery will be more likely to succeed in Amputations of the Cubitus or Tibia, than in the Parts beforementioned: But even here it is best to follow the Method at *N.* VIII. preceding, and never to have Recourse to the actual Cautery without absolute Necessity. Lastly, if, for the greater Security you are desirous of taking up the Ends of the divided Arteries with Needle and Thread, according to the modern Practice, (which, in my Opinion, is not very necessary in Amputations at the lower End of the Cubitus or Tibia) you are in this Case to take hold of the End of each divided Artery with a Pair of Pliers, termed the Crow's Bill (*Tab.* III. *Fig.* 4. or *Tab.* XIII. *Fig.* 5 and 6.) or some other of a convenient Make: And after passing round your crooked Needle with strong waxed Thread, with the latter you tie up the End of the Vessel.

Amputation of the Humerus.

X. When the Amputation is to be made above the Elbow in the Humerus, the Operation is to be performed almost directly in the same Manner as we prescribed for the Amputation in the Cubitus: Except that the brachial Arteries, of which there are sometimes but one, sometimes two or three, are to be always taken hold of with a Pair of Pliers, and secured by Ligature with a crooked Needle and waxed Thread, as we just before mentioned in *N.* IX. For in these large Arteries the Use of Styptics or Cauteries are found to be of little or no Efficacy. After the Extremities of the large Arteries are tied up, you must relax the Tourniquet a little, to discover the rest; which are to be also secured in the same Manner. Some Surgeons pass a small Needle and Thread through the End of the Artery, whilst held by the Pliers, joining the Thread with that with which they next make the Ligature: Which Method they take, in order to secure the Ligature from slipping off from the End of the Vessel. There are others, who, instead of extending the Ends of the Vessels with a Pair of Pliers, use a very crooked Kind of Needle, with strong waxed Thread, with which they perforate the circumjacent Flesh, first on one Side, and then on the other Side of the Artery, tying up a good deal of the adjacent Flesh together with the End of the Vessel, in order to prevent the Thread from cutting through the arterial Coats. But I think either of these Methods are rather inferior than preferable to the first, in which the Artery is extended with a Pair of Pliers, and then secured by Ligature with a crooked Needle and waxed Thread, passed round the End of the Vessel. For in the two latter Methods there is Danger

of

of paſſing the Needle wide of the Veſſel, or at leaſt the End of the Artery may eaſily fly back, or ſlip out of the Ligature[a].

XI. When you have dreſſed the Stump, and compleated the Deligation, according to *N.* VIII. the next Buſineſs is, to give the Patient a Draught of Wine or ſome Cordial; and when he is laid down upon the Bed, the End of the amputated Arm ſhould be compreſſed by the Hands of an Aſſiſtant for ſome Hours, which will not only make the Dreſſings adhere more cloſely, but alſo prevent any conſequent Hæmorrhage. This done, you may, by Degrees, relax the Tourniquet ſufficiently to admit of the Blood's Circulation through the Part: And if, upon the Relaxation of it, you meet with no Blood from the Wound, it is a Sign the Operation has been well compleated. In the next place you muſt recommend Reſt to the Patient, and order ſome nouriſhing Emulſion inſtead of common Drink, and paregoric Draughts to be repeated at proper Intervals; that he may hereby recover his loſt Strength, and be eaſed of his Pains by Sleep. The next Day you may again looſen, or elſe totally remove the Tourniquet, and give Orders for a proper Diet and Regimen, ſuch as will abate the febrile Heat and Motion of the Blood, and ſecure the Patient from a freſh Hæmorrhage, as in *Part* I. *Book* I. *Chap.* I. *N.* XLIII. Theſe Accidents may be ſtill better prevented by the Uſe of Phlebotomy at Diſcretion, with cooling Draughts and Powders: But Veneſection muſt be avoided, when the Patient is weak, or has loſt much Blood. If a freſh Hæmorrhage ſhould appear, ſo as not to be ſuppreſſed by the Application of another Compreſs and Bandage, with compreſſing the Stump for ſome time with the Hands, (which are generally ſufficient) in that Caſe you muſt re-apply the Tourniquet; and, after removing the Dreſſings, make a freſh Ligature upon the Ends of the Arteries. Or, if the Ends of the Arteries cannot be taken hold of, you may apply the actual Cautery, and defend the Stump with a larger Quantity of Lint, then ſecure it with an exact Deligation and Compreſſure for ſome time by the Hands, till the Hæmorrhage ceaſes. Treatment after the Dreſſing.

XII. The firſt Dreſſings and Bandage ought not to be removed from the Stump before the third or fourth Day, when the Mouths of the divided Veſſels may be ſuppoſed to be well cloſed and united: But in Caſe of Accidents, intenſe Pains, Inflammation, Hæmorrhage, or the like, you muſt renew them ſooner. Nor is it amiſs to order a Servant to attend conſtantly for the firſt Week at the Patient's Bed-ſide, provided with a Tourniquet, with which an incidental Hæmorrhage may be ſuppreſſed, till the Surgeon can be called to renew the Deligation. But if every thing ſucceeds well, in renewing your Dreſſings, you ought to remove them one after another very tenderly, and thoſe which are next, or adhere to the Wound, ſhould not be touched at all, much leſs violently forced away, if you are deſirous to avoid irritating the Part, and inducing an Hæmorrhage. 'Tis in this Caſe much the beſt for you to leave the adhering Dreſſings upon the Part for a few Days, and to moiſten them at each Dreſſing with warm Wine or its Spirit, till they become looſe, and ſeparate ſpontaneouſly in the Suppuration, without uſing any Violence. After the firſt Dreſſing, you need not dreſs again above once every other When and how to renew the Dreſſings.

[a] See DOUGLASS, *Syllabus Operat. Chirurg.* p. 44, 45. where, after the Amputation, he adviſes the Surgeon to unite the Skin croſswiſe.

Day, or every Day at moſt, except your Diſcharge be great, and in the Summer time.

What is to be obſerved In the Dreſſings.

XIII. In renewing your Dreſſings, it is chiefly neceſſary for you to obſerve, that your Wound be well and gently cleanſed from all the foul Matter with Lint, and then to dreſs it with flat Plates or Pledgits of ſcraped Lint; of which that next the Wound ſhould be moiſtened with ſome digeſtive Ointment, and the reſt applied dry. The Pledgits of Lint are to be ſecured and retained upon the Stump by three, four, or ſix ſticking Plaſters of *Emp. Diapalmæ*, or the like, of about a Foot in length, and a Thumb's breadth, croſſing each other upon the Part like a Star. Over theſe Plaſters muſt again be fixed a large ſquare Compreſs; and over that three other long and narrow Compreſſes in a ſtellar Poſition, ſecuring the whole by Deligation with your Roller. When your Dreſſings have been thus continued for about a Fortnight, there will not be occaſion for ſo much Lint, nor ſo many Compreſſes as at firſt: Nor need you then make your Bandage ſo tight, as there is no Danger of any Hæmorrhage. But in the mean time you muſt continue to treat the Wound with digeſtive Ointments and vulnerary Balſams, retained with Lint, a Plaſter, Compreſs, and Bandage, as in other Wounds, till it be healed; which uſually happens in about two Months. For the reſt, it may be here proper to adviſe the Surgeon to apply the Tourniquet, before he removes the firſt Dreſſings; eſpecially in Amputations of the Humerus or Femur, in order to prevent an Hæmorrhage: Or at leaſt the brachial Artery ſhould be compreſſed in the Middle of the Arm by the Thumb of an Aſſiſtant.

Treatment of the Fever.

XIV. Laſtly, as Amputations are often followed ſoon after with a Fever, eſpecially in plethoric and ſtrong Habits, it will, in that Caſe, be neceſſary to uſe Phlebotomy with paregoric and cooling Medicines, joined with a proper Regimen and Diet: Without which there may be Danger of loſing the Patient, either by the Violence of the vulnerary Fever, as it is termed, by a Sphacelus of the Part, or other bad Accidents.

An EXPLANATION *of the* THIRTEENTH PLATE.

Fig. 1. Exhibits a ſmall ſized Scalpel, more commodious for dividing the Skin and Fleſh in Amputations than the large crooked one following.

Fig. 2. Is the large crooked or falciform Knife, commonly uſed for dividing the Fleſh to the Bone in Amputations of the upper and lower Extremities, though in moſt Caſes I prefer the ſmall one, *Fig.* 1.

Fig. 3. The Catlin, or double-edged Scalpel, for dividing the Fleſh and Ligament betwixt the Bones of the Cubitus and Tibia; which may be alſo performed by a leſs and ſingle-edged Scalpel, like that in *Tab.* I. G. This Knife is alſo uſed in the Method of amputating the Tibia, which preſerves the Calf.

Fig. 4. Repreſents the Saw uſed for amputating Bones of the Limbs. This Inſtrument is by many delineated as large again as our Figure of it: But a Saw of the ſame Size, or but little larger than our Figure, will perform the Operation as well, and even more commodiouſly than a larger. This and the two preceeding Inſtruments are uſually embelliſhed with various Ornaments; which may ſerve to encumber them, and enhance their Price, but can add nothing at all to their Uſefulneſs.

Fig. 5. Re-

Fig. 2.

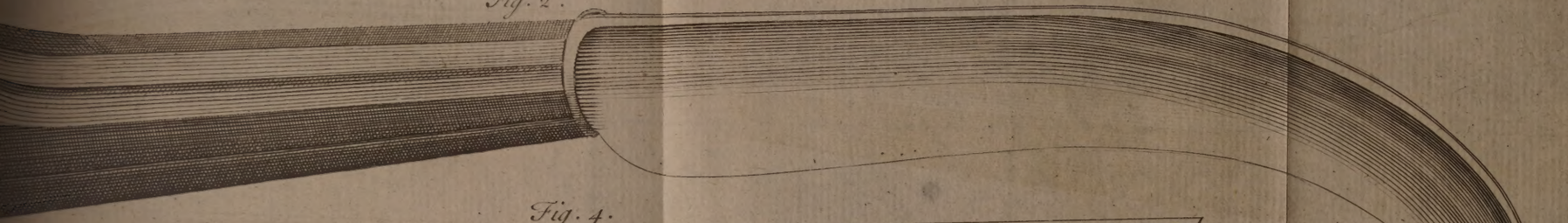


Fig. 4.

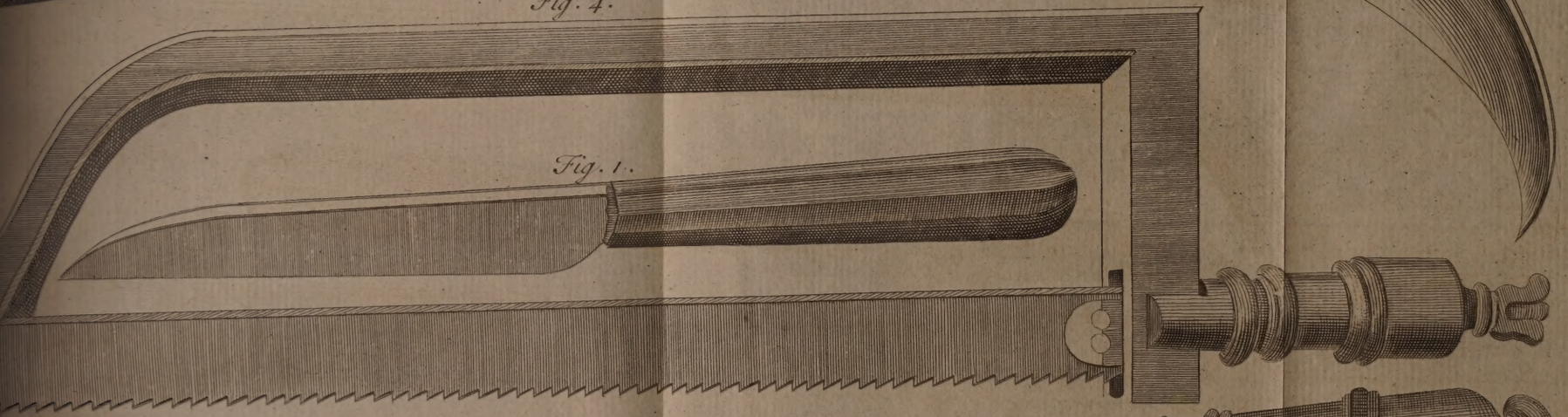


Fig. 1.

Fig. 3.

Fig. 6.

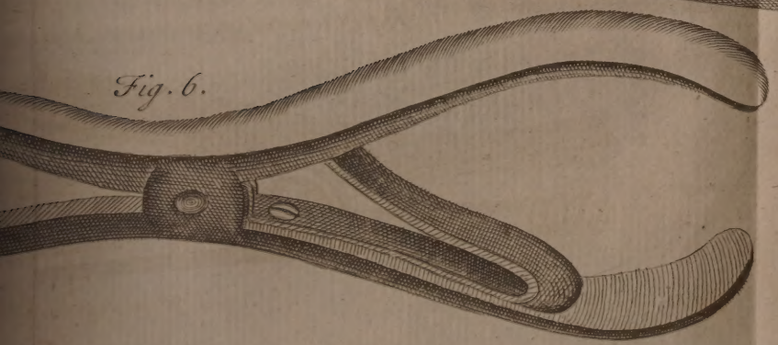
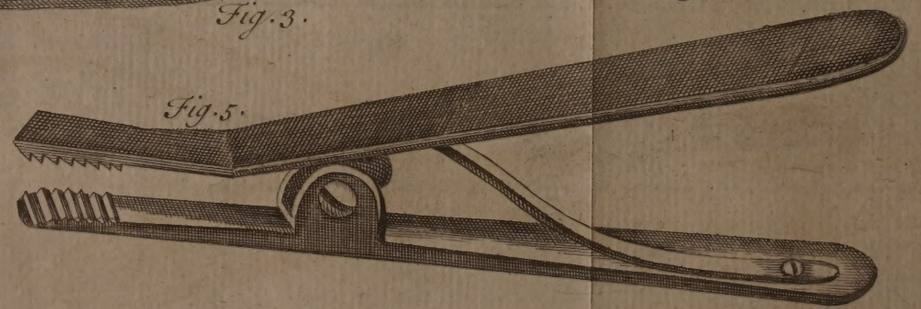


Fig. 5.



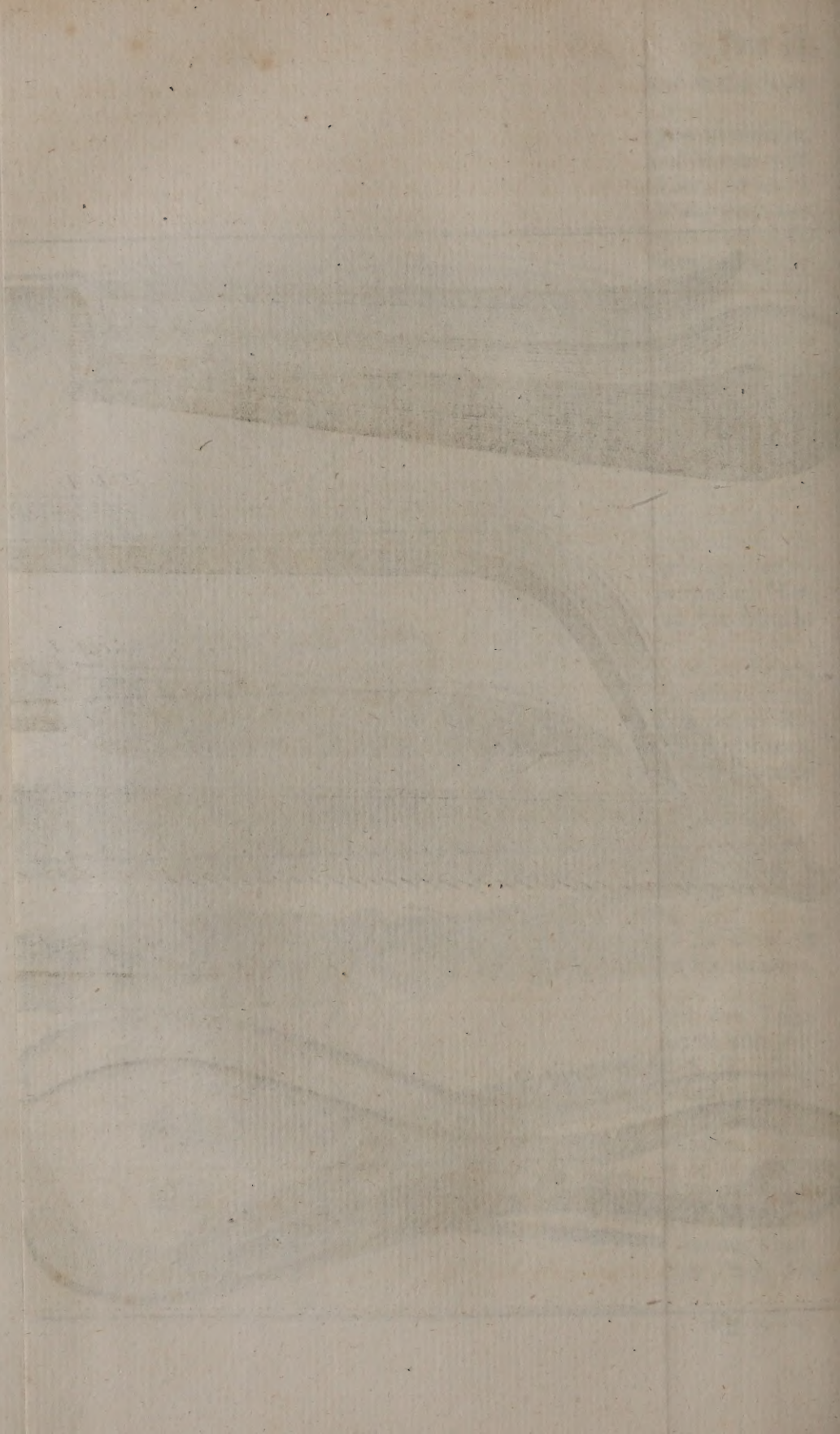


Fig. 5. Repreſents a Pair of Pliers, furniſhed with Teeth at one End, and a Spring at the other, for taking hold of the Ends of divided Arteries, in order to ſecure them by Ligature with ſtrong Thread, and ſtop their bleeding in Amputations of the upper and lower Extremities.

Fig. 6. Is another Pair of Pliers for the ſame Uſe, taken from M. GARENGEOT; which may be alſo made with very flat or no Teeth at the End, to avoid injuring the Coats of the Artery.

CHAP. XXXV.

Of Amputating the FOOT *and* LEG.

I. THE antient Surgeons, in Amputating the Foot at the Tarſus or Metatarſus, uſed a large Chiſel and Mallet, and ſometimes a Pair of large Cutting Pincers, with which they ſeparated the diſeaſed Parts, and then treated and healed the Wound with Balſams in the uſual Manner: Which Practice is confirmed and explained by SCULTETUS, in his *Armament. Chirurg. Tab.* LIV. But as the Tendons and Ligaments, ſeated in thoſe Parts, are, in this Method, violently lacerated and contuſed, the modern Surgeons have therefore juſtly preferred the Amputation of the Toes and Metatarſus by the Scalpel; conducting the Remainder of the Cure as in other Wounds: And in this Manner the Leg may be much better ſupported by the Heel or Stump, than by a wooden Machine [a]. But becauſe they were afraid of this Practice, from the Difficulty of covering the Bones, and healing up the Wound, they rather followed the more dangerous Method of Amputating the Leg about four Fingers Breadth below the Knee, inſtead of taking it off in the lower Part of the Tibia. By this Means, though they cut off a large Part of the Leg which was not yet diſordered, they avoided the Deformity and Inconvenience in ſitting down, which the Patient would have met with from preſerving it on: For a long Stump of the Leg can neither be ſtood upon nor well adapted to a wooden Machine. Therefore it was thought moſt convenient to amputate it in the upper Part of the Tibia, about a Hand's Breadth below the Patella, to avoid injuring the Tendons of the flexor Muſcles, and the better to adapt the Knee to a Silver or wooden Leg. I am indeed ſenſible that many Surgeons, even at preſent, approve of Amputating no higher than the Diſorder has ſpread itſelf, agreeable to the Advice of SOLINGEN, VERDUYN, and DIONIS. But I think their Authorities ought to be but little regarded; not only becauſe of the Difficulty there will be of adapting a wooden Machine to the lower Part of the Tibia above the Ancle, but alſo upon the Account of the Deformity which the long Stump of the Leg will occaſion, if the wooden Machine is adapted to the Knee.

The Place for amputating the Tibia.

II. With regard to the Inſtruments and Dreſſings uſed in this Operation, they are almoſt the ſame which we before deſcribed for Amputating the Arm; Only it may be here neceſſary to add a few Cautions which relate more particularly

Obſervations peculiar to Amputations of the Tibia.

[a] This GARENGEOT adviſes, *Oper. Chirurg.* Tom. III. p. 417. Edit. 2.

larly to Amputations of the Tibia. Theſe are, (1.) To place the Patient upon a low Seat or Bed, ſo that he may lean backward, and extend his Legs[a]. (2.) To ſhave off the Hair with a Razor from the Part where the Amputation is to be made, to prevent the Plaſters, afterwards applied, from adhering to them, ſo as to give the Patient intenſe Pain in removing them. (3.) To ſecure the divided Arteries, which appear in the Stump of the Tibia, rather by Ligature, with Needle and Thread, than by Styptics, or actual and potential Cauteries. For though theſe Arteries do not appear very large, yet if they are not ſecured by Ligature, they generally open and bleed profuſely ſoon after the Deligation; eſpecially if the crural Artery be not well ſecured with narrow Compreſſes and Bandage. (4.) The crural Artery is to be compreſſed with the Tourniquet, either of the common Sort, turning with a Stick, or the modern Screw Tourniquet. Or elſe you may make a ſtrict Ligature above the Knee with a Bandage twiſted in a cylindrical Form, ſo as to compreſs the Artery deſcending in the Ham, as in *Tab.* XIV. *Fig.* 4. D. Yet, in my Opinion, it is much better to apply the ſame Ligature higher up upon the Thigh, in order to compreſs the Artery, eſpecially when the Tibia is to be amputated near the Knee. See *Tab.* III. *Fig.* 1. L M; by which means the Dreſſings may be more conveniently applied after the Operation, than if the Tourniquet was fixed nearer to the Knee.

VERDUYN's Method of Amputating.

III. We have another new Method of Amputating the Tibia propoſed by VERDUYN, in a Diſſertation upon the Subject in the Year 1696: Which Practice he ſtrongly recommends for the publick Good; though he does not pretend to be the original Author of it. There are indeed many who attribute the Honour of inventing this Operation to one SABOURIN of *Geneva*, as GARENGEOT, and ſome other Members of the Royal Academy; who aſſert, that in their Time VERDUYN performed the Operation firſt at *Geneva*, and then at *Paris*. At the ſame time I find the Operation deſcribed and performed by the *Engliſh* Surgeons LOWDHAM and YOUNG, in an *Engliſh* Treatiſe concerning the wonderful Virtues of Oil of Turpentine in Hæmorrhages, together with a new Method of Amputating, by JAMES YOUNG, 8vo *Lond.* 1679. The ſame Operation was afterwards improved and deſcribed by my Friend KOENERDINCIUS, Surgeon of the Hoſpital at *Amſterdam*, in his *Dutch* Treatiſe *De Gangræna & Sphacelo, Cruraque amputandi Ratione veteri ac nova*, 8vo *Amſtel.* 1698; which was the ſame Year in which VERDUYN twice performed this new Method of Amputation. A brief Deſcription of which is as follows.

IV. Firſt, the *Tendo Achillis* is divided from the Ankle by the Scalpel, *Tab.* XIII. *Fig.* 3. then a longitudinal Inciſion is made upwards, and the Tendon ſeparated from the Bones of the Leg as high as the Part where the Bones are to be amputated by the Saw. See *Tab.* XIV. *Fig.* 4, 5, 6, 7. This done, the Fleſh compoſing the Calf of the Leg, *Fig.* 6. A, is drawn backward with a Cloth towards the Ham, by the Hand of an Aſſiſtant: And then the Integuments and Fleſh upon the Forepart, and betwixt the Bones, are divided in the uſual Manner, by a proper Scalpel, *Tab.* XIII. *Fig.* 1 and 3; and the Bones next amputated by the Saw. Then the Fleſh is brought over, and adapted to

[a] HILDANUS in this Caſe places the Patient on the Ground, but his Foot on a low Stool.

the

the Stump of the Tibia, after it has been firſt waſhed with Spirit of Wine: and if there be any unequal and ſuperfluous Parts, they are cut off with a Scalpel; the Remainder being retained in its proper Situation by ſticking Plaſters, or a few Stiches with Needle and Thread. Laſtly, Compreſſes with a wet Bladder and Bandage are applied in the Manner we before directed, in treating of Amputations in general: Or, inſtead of them may be uſed a retentive Machine, figured by VERDUYN and GARENGEOT, for the Purpoſe, being made of Leather, with Straps and Buckles, by which the Stump being ſecured, it is then to be compreſſed for a few Hours by the Hands of an Aſſiſtant, till there is no Danger of an Hæmorrhage. To prevent that, you may alſo apply the Screw Tourniquet, *Tab.* V. *Fig.* 6. or *Tab.* VI. *Fig.* 1. Thus the Operation is compleated, the Advantages of which to the Patient, according to the forementioned Authors, are many. As, (1.) The Calf of the Leg being thus preſerved and adapted to the Stump, cloſes and compreſſes the Mouths of the divided Arteries, ſo as to prevent an Hæmorrhage, without the Uſe of Cauteries, or the Application of Ligatures. (2.) The Ends of the Bones being thus immediately covered with the Fleſh, are not ſo liable to be infeſted with a Caries, as they frequently are in the common Method, which greatly retards, if it does not fruſtrate the Cure. (3.) The Fleſh of the Calf readily unites with the Ends of the divided Bones of the Leg; ſo that by treating the Wound with vulnerary Balſams, in the ſubſequent Dreſſings, the Cure is ſpeedily compleated. Laſtly, (4.) The Fleſh thus adapt to the Ends of the Bones, ſerves as a Pillow ever afterwards to ſupport them; ſo that the Patient may eaſily ſit down, without being obliged to bend the Stump, as he muſt do after the common Method. Add to this, that the Stump may be adapted perpendicularly to a hollow wooden Leg, ſo that the Patient may ſtand or walk upright upon an artificial Leg, as upon his natural one. Every time the Stump is dreſſed, the Portion of Fleſh which wraps over it, muſt be gently ſupported, and preſſed up againſt the Ends of the Bones, that its Weight may not make it ſeparate or ſubſide, ſo as to prevent its uniting. A more particular Account of this Method may be ſeen, illuſtrated with proper Figures, in the forementioned Treatiſe of VERDUYN.

V. Notwithſtanding the before-deſcribed Method had been ſeveral Times performed with Succeſs by VERDUYN, and ſome others, yet it met with the Approbation of but few Surgeons: So that it was not able to prevail over the common and received Method of amputating the Tibia. Inſomuch, that it was ſoon after deſerted even by its own Patrons, VERDUYN and KOENERDINGIUS: To which add, that the Patient, upon which SABOURIN performed this Operation at *Paris*, died ſoon after it, as did ſeveral at *Amſterdam*; at which laſt Place ſeveral Patients were troubled with acute Pains, and other bad Accidents, from little Splinters, or the rough Ends of the Bones irritating the Fleſh, even after the Stump was healed up: Not to mention the large Quantity of Blood loſt by SABOURIN's Patient, which was even greater than in the common Method of amputating; which, with other Inconveniencies, induced KOENERDINGIUS to prefer the common before this new Method, in his Treatiſe on this Subject. Notwithſtanding all this, we find M. GARENGEOT, who ſeems to be ignorant of the forementioned Writings of YOUNG and KOENERDINGIUS on the Subject, endeavouring lately to recommend and re-eſtabliſh this uncommon Method of Amputating: As may be ſeen in *Chirurg. Operat. Chap.* of Amputations of the Tibia.

VERDUYN deſerts his Method.

Tibia. M. GARENGEOT there relates, that there were ſeveral Men then living in *France*, who had the Operation happily performed on them in this Manner; ſo that they could not only ſit down eaſily, but alſo leap very nimbly. But if we would reaſonably expect to ſucceed in this Method, the Patient ought to be not only healthy in all other reſpects, but the Cauſe, which requires the Limb to be amputated, ſhould be from ſome external Violence.

The ſame Method practicable in the Humerus.

VI. Laſtly, it is to be obſerved, that the new Method of amputating, which we have been now deſcribing, may, according to the Opinion of our modern Surgeons, be not only performed in the Tibia, but alſo in the Cubitus, by preſerving a Quantity of the Fleſh and Integuments, to wrap over the Ends of the Bones. Agreeable to this, the Operation was in the ſame Manner performed with Succeſs by RUYSCH, in the Preſence of VERDUYN and BORTELIUS his Kinſman. See the Treatiſes on this Subject by YOUNG and KOENERDINGIUS; alſo RUYSCHII *Epiſt. Problemat.* XIV. *de nova Artuum decurtandorum Methodo.*

CHAP. XXXVI.

Of Amputating the THIGH.

Amputation of the Femur, when neceſſary.

I. THE Surgeon frequently finds it neceſſary to amputate the Leg above the Knee, removing Part of the Thigh itſelf, when a Mortification has reached the Joint, or when the lower Head of the Femur is carious, ſphacelated, cruſhed to pieces, or the large crural Artery irrecoverably wounded. In theſe Caſes the Succeſs of the Operation is very dubious, eſpecially when the Amputation is made very high up in the Thigh. Nor is the Patient in Danger of being loſt only from a profuſe Hæmorrhage, from the Diviſion of ſo large an Artery as that of the Femur; but the Quantity of Matter diſcharged daily from ſo large a Wound does often ſo much extenuate and weaken the Patient, that he cannot ſubſiſt till the Cure is completed. Therefore whenever the Surgeon finds it neceſſary to amputate in the Femur, he ought to do it as low as poſſible, as near within three Fingers Breadth of the Knee as he can, leaving a good deal of Fleſh, and more of the Skin, to wrap over the End of the Stump: By which means the Cure of the Wound will be much expedited, the Diſcharge of Matter at each Dreſſing rendered leſs profuſe, and the Patient, not being ſo much impaired in his Strength, will be more likely to get happily through the Cure.

Application of the Tourniquet.

II. The Application of the Tourniquet for compreſſing the crural Artery, whether it be the common one with the cylindric Ligature and Turn-ſtick, or the Screw Tourniquet, muſt be made upon the upper and internal Part of the Thigh, as near as you can to the Place where the Head of the internal Vaſtus Muſcle and the Triceps touch each other, as in *Tab.* III. *Fig.* 1. L M. Without this Precaution you may be liable to have ſuch a profuſe Hæmorrhage from the large femoral Artery as will inevitably deſtroy your Patient; which frequently happened to the antient Surgeons before the Invention of the Tourniquet.

III. With

III. With respect to Amputations of the Thigh in general, little more need be added to what has been said on this Operation in the Arms and Legs: As in the first Place, to let the Hair be shaved off, and after you have made a circular Incision through the Integuments with a small Scalpel, *Tab.* XIII. *Fig.* 1. to extend or draw them upwards as much as possible before you divide the Flesh, or Muscles, which last you must amputate a good deal higher than the circular Incision through the Integuments. You may cut through the muscular Flesh at your second Incision, either with the Scalpel, with which you divided the Integuments, or with the Knife for amputating Breasts in *Tab.* XXII. *Fig.* 7. or else with the large crooked Knife in *Tab.* XIII. *Fig.* 2. With either of which you must cut all round close to the Bone: By which Method of proceeding you will have the Stump of the Bone covered over with Flesh and Skin in a little time, so as to be healed in a few Days; and at the same time you avoid the risque of a Caries in the Bone from its being exposed to the Air, as we once before observed. For want of this Precaution in Amputations of the Thigh, when the Muscles have been divided even with the Integuments, the Muscles have contracted, and drawn themselves up to such a Degree, that I have frequently seen the Bone standing out like a Stick for above two or three Fingers Breadth from the Flesh. In this Case the Patient must be a long Time, and be much weakened by the Discharge of Matter, before the Muscles can be extended and brought down, so as to cover the End of the Bone, without which the Cure can never be completed. With regard to the Hæmorrhage in Amputations of the Thigh, that must be always prevented by making an exact Ligature upon the femoral Artery, which is much too large to be safely secured by any other Method; and, for the same Reason, your Ligature upon it must be very firm and secure, by tying it up with a strong Thread passed round after the End of the Artery is extended or drawn a little out from the Flesh with a Pair of Forceps, or a Tenaculum, *Tab.* XIII. *Fig.* 5. and 6[a]. If there appear to be more large Arteries than one divided, they must be also secured by Ligature in the same Manner; but for the smaller Arteries, it may be sufficient to close them by Styptics, or Vitriol, and Dossils of scraped Lint without Ligature. The Dressings and Deligation are to be much the same for an amputated Thigh, as we before directed for an Amputation of the *Humerus:* Only the Quantity of Lint, Fungus, Bladder, Compresses, *&c.* must be proportionably larger, and the Bandages much longer. To which you must here add a long, thick, and narrow Compress, to be imposed all along the Thigh over the crural Artery, and secured there by a Bandage peculiar to itself: Or, instead of this, you may fix the Tourniquet, *Tab.* V. *Fig.* 6. or *Tab.* VI. *Fig.* 1. and leave it upon the Limb for some time. The Deligation being completed, and the Patient put to Bed, his Thigh must be placed in an easy elevated Posture on a Pillow, that the Impetus of the Blood, on the End of the Artery, may be less than in a direct Position: Which will greatly conduce to the Prevention of a fresh Hæmorrhage. Lastly, the Stump should be compressed for some Time by the Hands of an Assistant, ordering a proper Diet, Regimen, Medicines, *&c.* as we observed in Amputations of the Humerus.

The Method of Amputating and Dressing the Femur.

[a] PETIT gives a Description of another Ligature, *Mem. Acad. Reg. Paris.*

IV. If

Treatment of Limbs amputated by Gun-shot.

IV. If Part of the Leg or Arm should be carried away by a Bullet-shot, or Cannon-ball, or be torn off by a Cart-wheel, or Mill, or some such other Machine, the first Step to be taken by the Surgeon in these Cases, is, 1. immediately to apply the Tourniquet to compress the Artery, and stop the Hæmorrhage: And then, 2. To cut off the rough End of the Bone by the Saw, or cutting Pincers, that there may be no Points or Splinters to irritate the sensible and fleshy Parts. But if there are no Splinters, or rough Parts, the Surgeon need not cut off any thing. Lastly, 3. To secure and close up the Ends of the wounded Arteries, either by Ligature, when they are large and accessible, or else by the Cautery, or by Compression with Lint, Styptics, and Compresses, according as particular Circumstances may indicate to the Surgeon. Which being performed, the rest of the Dressings and Deligation are to be completed in the Manner we have before directed for other Amputations[a].

Botallus's Method of amputating rejected.

V. The celebrated *French* Physician BOTALLUS formerly inventeda very expeditious Method of amputating Limbs in an Instant, by letting a sharp Instrument fall down upon them from a certain Height loaded with a great Weight; by which means the Limb is struck off at one Blow, without the Use either of Knife or Saw. BOTALLUS has been also seconded in this Method of amputating by HILDANUS. Notwithstanding which, the Artifice has been reasonably rejected by almost all the prudent Surgeons, who have succeeded them: For it is hardly possible that a Limb should be taken off in this Manner without shattering or splintering the Bone. Consult BOTALLUS in his Treatise, *De Vulneribus Sclopetorum.*

The adapting of artificial Limbs.

VI. After the Stump is healed up, the Surgeon may provide an artificial Limb of Silver, for those who can afford it, or of Wood for others; adapted to the Stump, so that it may be fastened on by Straps and Buckles, or by Springs. Of these Machines we are furnished with various Specimens in AMB. PAREY, HILDANUS, SOLINGEN, *&c.* and by our modern Artists, who make these kinds of Instruments, and other curious Machines. But, for the poorer Sort, it may be sufficient to supply them with a wooden Machine, turned and cut into a proper Shape, with a Hollowness or Cavity at the upper End for receiving the Stump of the Knee, that they may, by this means, be enabled to walk, or sit down, though not in an elegant Manner.

Removal of a Caries.

VII. As a Caries of the Bone is no unfrequent Accident in Amputations, the Surgeon should therefore endeavour to guard against it as much as possible: Even at its very first Appearance he should strive to remove it, either by the Application of *Euphorbium*, or the actual Cautery, because it prevents the Progress of the Cure; notwithstanding the Writers in Surgery usually pass by this Accident, without taking notice thereof. There still remains a Practice which, in my Opinion, will very often succeed beyond either *Euphorbium*, or the Cautery; and that is, to exfoliate or pare off the diseased Parts of the Bone with a Knife or Rasp till you come to the sound: By which means the Flesh will then readily unite with the Bone to complete the Cure, which it cannot while the Caries remains.

[a] PETIT has described a Machine for suppressing the Hæmorrhage in the crural Artery after this Amputation, which will effect it without a Ligature on the Artery, or any other Method abovementioned. *Mem. Acad. Reg. Paris.* A. 1731. This Machine you will find in my *Plate* XXXIX. with a particular Description of it.

CHAP.

CHAP. XXXVII.

Of Amputating the ARM *in its Articulation with the* SCAPULA.

The Design of this Chapter.

I. THOUGH I never yet attempted to amputate the Humerus in its Articulation with the Scapula, nor so much as found it treated of by any of our Chirurgical Writers, except LE DRAN, *Obs.* 43 and 44. after whom the Operation is described, without mentioning his Name, by GARENGEOT, (*Chirurg. Operat. Cap.* LIV.) yet, that the Surgeon may not be ignorant of what has been advanced on this Head, I shall make it the Business of this Chapter to give a brief Description thereof.

When the Arm may be thus amputated.

II. According to the two last mentioned Authors, there are two Cases in which it may be necessary to amputate the Arm in its Articulation at the Shoulder. The first is, when the upper Part of the Humerus is violently contused and shattered by a Cannon-ball, Bomb, or Granade. The other Case is, when the upper Head of the *Os Humeri* is irrecoverably vitiated from some internal Cause, as from an Abscess, a Caries, or *Spina Ventosa:* To which we may add, a Mortification of the Arm extended to the Shoulder, *&c.*

Previous Requisites for the Operation.

III. But before you enter on this dangerous and difficult Operation, it will be absolutely necessary to have every Member of your Apparatus of Instruments and Dressings prepared and disposed each in their proper Order: After which you are to fix the Patient upon a convenient Seat with his Face covered. You must next observe, that the Tourniquet is not here fixed upon the Arm, as we before described for the common Amputation of it: But that Instrument is, in this Case, laid aside, and the Trunk of the brachial Artery is first secured by Ligature in the following Manner, before you begin to amputate.

What is to be first done in the Operation.

IV. The Patient being properly seated, with his Arm extended, and secured by an Assistant, you must then carefully search out the true Seat and Course of the brachial Artery at the Axilla: In doing which you will be much assisted by being previously versed in the Anatomy of the Part. If the Tumor should be so large as to prevent your Investigation of the Artery, by feeling through the Integuments, you make a longitudinal Incision through them to the Bone, on each side the Arm, so that you may pass your Fingers by the Bone, and discover the Artery. Which done, you must then pass a large Needle [a] with six or eight Threads through the Flesh within two Fingers Breadth of the Cavity in the Axilla, so that the Needle may pass through close to the Bone, and betwixt that and the Artery, without injuring the latter. The Needle and Ligature being thus conveyed betwixt the *Os Humeri* and Artery, the Arm is now let down a little, to relax the Skin, and the Ligature is then tied with a Surgeon's Knot. Your next Business is, to examine if there be any Pulse in the Artery below the Ligature as it runs down the Arm: If so, your Ligature must be drawn tighter till you can perceive no Motion there: And then your Ligature must be secured from getting loose by a Knot or two more.

What is to be observed in the Operation.

V. There are three Things chiefly necessary for you to observe in the Operation, after the Artery has been thus secured by Ligature to prevent a fatal Hæ-

[a] LE DRAN uses a strait Needle; but GARENGEOT recommends a crooked one, like that to be seen in *Tab.* XIV. *Fig.* 10.

morrhage. These are, 1. To leave Skin and Flesh enough upon the Shoulder; 2. To cut through the muscular Flesh in the most convenient Manner; and lastly, 3. To divide the capsulary Ligament which invests the Head of the Bone, and connects it to the Scapula, so that it may be taken out of the glenoeide Cavity in the latter, and be afterwards amputated entirely. To perform each of these Intentions with Success and Dexterity, the Surgeon ought previously to make himself well acquainted with the Nature of the Articulation, with the Position of the *Processus Acromion*, and to be careful that a sufficient Quantity of Skin be preserved and drawn back to wrap over the Wound; and, lastly, to amputate with his Scalpel two or three Fingers Breadth below the Acromion, so as to preserve a large Portion of the deltoeide Muscle. This Method will not only fill up the Cavity of the Wound at the Shoulder, so as to render it uniform and even, but will also much expedite the Cure.

The Manner of Amputating.

VI. Every thing being thus far considered and advanced, you now take the Scalpel, *Tab.* XIII. *Fig.* 1. or *Tab.* XII. *Fig.* 14. and therewith make your Incision through the Integuments, and through the deltoeide Muscle, as near within the Joint as we before directed. Which done, the Arm is then gently elevated, the better to discover and divide the Heads of the Biceps Muscle: And if, in performing this, you divide any considerable Arteries or Veins, which bleed so as to obscure your Work, they may be stopped for the present, either by Compressure with the naked Fingers of an Assistant, or by the Application of Lint and Compresses. But if the Hæmorrhage is profuse, and arises from a considerable Artery divided, as there frequently is a large Branch here, you must, in that Case, first secure it by Ligature, before you proceed farther in your Operation. The next Step is, to divide the Ligament of the Articulation first in its upper Part, and then on each Side, but very cautiously; moving the Head of the Humerus at the same time with your left Hand, that you may only divide the investing Ligament of the Articulation without injuring the Artery. Thus you may be sensible whether the Arteries are well secured: But even afterwards you must be very cautious not to wound the Artery, in dividing the rest of the muscular Flesh beneath the Articulation. Lastly, you must divide the Skin from the Arm near the Axilla, to leave a triangular Piece, with its Corner outermost, and its Basis next the Body, so as to be afterwards brought up over the Wound: And thus your Amputation is completed.

What must be done after the Amputation.

VII. The Arm being totally removed in the Manner now described, you must next search for the Artery you before secured by Ligature, together with a Portion of the Flesh; and having discovered it, you now make another Ligature above the former upon the Vessel only, by a small crooked Needle, *Tab.* VI. *Fig.* 5. with strong Thread: After which you remove the first Ligature from the Flesh and Vessel, to prevent it from exciting an Inflammation.

Dressings and Deligation.

VIII. You come now to the Dressings of the Stump: Which must be made with a Pledgit of Lint, with small Linen Compresses upon the Ends of the divided Arteries you before secured by Ligature. The lower Part of the Skin is then drawn upward, and the upper Part is drawn down together with a Piece of the deltoeide Muscle. Though, in my Opinion, it would be better to apply no Pledgit or Compresses to the Arteries or Bone, before you have thus filled the Sinus of the Wound with the adjacent muscular Flesh, and brought the Skin well over: And then you may apply your Pledgit of Lint and Compresses; by

which means the Flesh will more readily unite, and the Wound heal sooner than if you interposed Lint and Compresses. In the next Place, a large Quantity of Lint must be secured on the Wound by a sticking Plaster, cut in the Shape of a *Malta* Cross: Over which Plaster you impose a large and thick square Compress, with a cylindric Compress in the Axilla, to resist against the Ends of the Arteries, that they may be better able to endure the Impetus of the Blood in their Pulse. All these are to be again retained by a large double Compress in the Form of a *Malta* Cross; and that again invested by two other Compresses a little more than a Foot long, and four Fingers Breadth. The first of these is applied obliquely over the Stump, so as to let one End come over to the sound Shoulder, and the other End pass behind to the sound Axilla, or about a Hand's Breadth lower: The other and longer Compress must be imposed, so as to cross the former in opposite Directions, and to have its Ends cross each other upon the sound Shoulder. Lastly, your Deligation must be completed with the Bandage termed *Spica descendens*, as we shall direct in the last Part of our Surgery. But, in making this Bandage, you must fix a thick Compress, or a small Pillow, in the Axilla, that the Bandage may sit the neater, and not compress the Veins too much which are there seated.

IX. The abovementioned Operation, as here described, was performed on a *French* Nobleman for a *Spina Ventosa*, in the upper Head of the *Humerus*, by LE DRAN the Elder, with the Consent and Presence of the most expert Surgeons in *Paris*, as M. MARESCAL, ARNEAU, PETIT, MERY, *&c.* And this he did with Success, the Patient being perfectly cured, as we are told by LE DRAN his Son, and M. GARENGEOT. But the last of these Authors tells us, in a second Edition of his Operations in Surgery, that the said Nobleman died within six Months afterwards of a Plethora[a]. M. GARENGEOT also directs this Operation to be performed for an Abscess in the Articulation. But whether it would be prudent to perform so dangerous and difficult an Operation, for a simple Abscess there, I leave to the Judgment of every experienced Surgeon. An Example of this Method of Amputating.

A Method of Amputation not much unlike this, which I recommended in the Arm, after an extraordinary Burn, *A. D.* 1739, you have here as follows: A poor Woman in a neighbouring Town, as she sat alone at Home, being seized with a Fit, fell into the Fire; by which Accident her Right Arm was burnt to the Bone, from the Hand quite up to the Shoulder, (see *Plate* XXXIX. *Fig.* A and B.) There was no Way of preserving the poor Woman's Life, but by taking off the Arm. But as the Tourniquet could not be applied without giving her excessive Pain, (the Skin being burnt to the Neck and Breast, and for other Reasons) I thought it more prudent to take the following Method. I ordered a large Needle, with a Thread of a proper Size, to be passed under the Head of the *Os Humeri*, where the brachial Artery descends, through the little Flesh that remained near the Bone. A Ligature was then made with the Thread on the Artery and the remaining Flesh; then the Flesh was cut with the Scalpel under the Ligature, and the Bones afterwards sawed off in the usual Manner. This was done in the Presence and under the Direction of my Son, without the Help of the Tourniquet: And with such Success, that the Wound, after the Amputation, bled but little (which is uncommon in these

[a] In his *Operat. Chirurg.* Tom. III. near the End.

Caſes and healed to our Wiſh, the Woman being ſtill alive and in Health. Which ſingular Caſe was publiſhed by my Son the ſame Year; and this Practice there recommended in many other Caſes, particularly in ſtopping Hæmorrhages of the brachial and crural Arteries: As may be ſeen more at large in his Treatiſe on the new Method of Amputating the Arm.

An EXPLANATION *of the* FOURTEENTH PLATE.

Fig. 1. Shews the Manner in which the Patient, Surgeon, and Aſſiſtants are to be placed for amputating the Hand, or Arm. A denotes the Patient, B the Surgeon amputating with the Saw; C the Aſſiſtant extending the Hand, D another Aſſiſtant holding the Arm; E the Aſſiſtant who holds the Patient's Body, and takes Care of the Tourniquet; F denotes the Diſh or Veſſel placed underneath to receive the Blood.

Fig. 2. Repreſents the Poſition of the Patient, Surgeon, and his Aſſiſtants amputating the Leg. A denotes the Patient ſeated in a Chair; B the Surgeon; C the Aſſiſtant who holds the Foot below the Calf; D the Aſſiſtant who holds the Leg above the Knee: E a Veſſel placed on the Floor, to catch what little Blood may be ſpilt in the Operation.

Fig. 3. Denotes the moſt convenient Part for amputating the Leg at A, and the Thigh at B. But when the Diſorder has extended itſelf higher up in the Thigh, it muſt be amputated proportionably above this Mark, though the Operation is then ſo much the more dangerous.

Fig. 4. Repreſents the Thigh A, with the Leg amputated B, in which may be ſeen the Part for fixing the Tourniquet C D, for amputating the Foot in the Tarſus or Metatarſus. The Tourniquet thus applied may alſo ſerve for amputating the Leg or Thigh, though not ſo conveniently as when placed higher up. In this Figure you have alſo a View of the divided Artery extended a little by the Pliers E, and going to be tied to the Ligature and Knot F. There are ſome indeed who do not approve of this Manner of tying the Ligature: But I have often experienced that it thus anſwers very well [a].

Fig. 5. Deſcribes the Manner of amputating the Leg, ſo as to preſerve the Calf. The Line A B denotes the firſt Inciſion to be made by the Scalpel, *Tab.* XIII. *Fig.* 1. or *Fig.* 3. The Line B C is the Courſe of the ſecond Inciſion, by which the Fleſh of the Calf is ſeparated from the Bones of the Leg. C D the Place, where the Bones and reſt of the Leg are amputated. Some reverſe this Courſe of Inciſion, and firſt perforate the Calf with a double-edged Scalpel, *Tab.* XIII. *Fig.* 3. in Line C, and then they direct the Kife in the Courſe B A. But the firſt Method is, in my Opinion, moſt eligible.

Fig. 6. Repreſents the Manner of reflecting back the Calf of the Leg towards the Ham, after it has been ſeparated from the Bones of the Leg by Inciſion: which done, the Surgeon next incides the Integuments, Fleſh, and Perioſtæum in the Line B, and then ſaws off the Bones there.

Fig. 7. Denotes a Leg juſt amputated with the Calf A depending, to ſee the Ends of the two Bones: B the Tibia, and C the Fibula.

[a] GARENGEOT finds Fault with this Method, *De Inſtrument. Chirurg.* Tom. II. p. 219. But LA MOTTE, another of our moſt eminent modern Surgeons, very much approves of it.

Fig. 8.

Fig. 3.

Fig. 4.

Fig. 5.

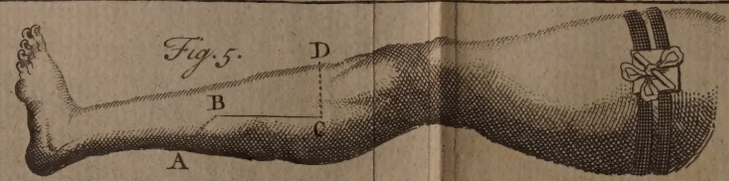


Fig. 6.

Fig. 7.

Fig. 8.

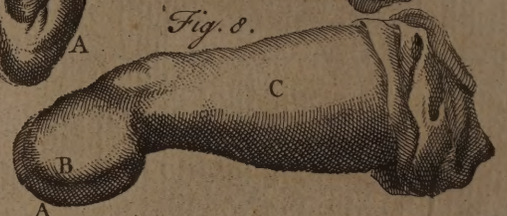


Fig. 1.

Fig. 2.

Fig. 9.

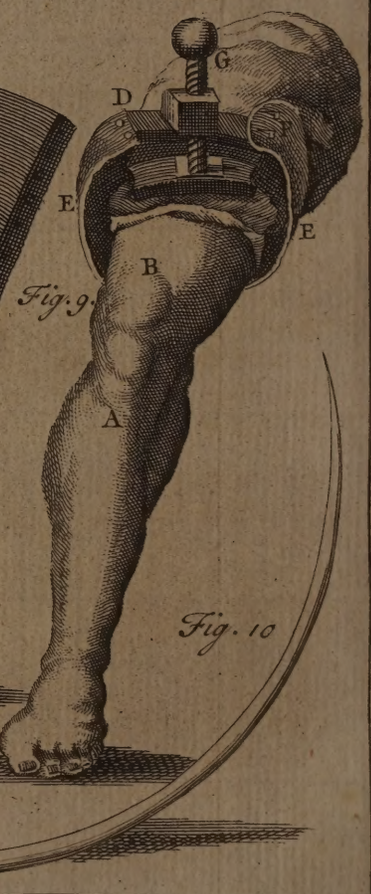


Fig. 10

Fig. 8. Shews the Leg thus amputated, with the Calf A brought over and joined to the Stump B: C denotes Part of the Thigh.

Fig. 9. Repreſents the Method of applying the Screw Tourniquet (*Tab.* V. *Fig.* 6. or *Tab.* VI. *Fig.* 1.) above the Knee; A denotes the Leg; B the Thigh; CC the Preſs of the Tourniquet with its ſubjacent Pillow; D the Place where the leathern or ſilken Strap E E is faſtened by Studs on one Side, and by the Hooks F on the other Side; G the Screw, by turning which the ſubjacent Artery is compreſſed in the Ham.

Fig. 10. Is a large crooked Needle for making a Ligature on the brachial Artery before the Arm is amputated in its Articulation with the Scapula, though the ſame may be alſo performed by the ſtrait Needle, *Tab* XVIII. either of which Needles will alſo ſerve for making Setons in the Neck.

PART II. SECT. II.

Of Operations *belonging to the* Head.

CHAP. XXXVIII.

Of making Issues *upon the* Coronal Suture.

I. Issues are ſometimes made in the Scalp of the Head upon the Meeting of the coronal with the ſagittal Suture: But this Operation is not ſo frequent in *Germany*, as in *Italy* and *Holland*. Some Phyſicians think Iſſues in this Part can be of little or no Service, being not able to diſcharge any Humours from the internal Parts of the Head: And others again aſſert them to be of very great Efficacy, for the Truth of which they appeal to daily Experience. So that if we may confide in Experience, and the Authorities of able Phyſicians, we muſt readily acknowledge that Iſſues, made in this Part of the Head, may be highly ſerviceable in Vertigo's, obſtinate Head-achs, Apoplexies[a], Epilepſies[b], Amauroſis[c], Stupidity, or Forgetfulneſs[d], with many other Diſorders of the Head, and particularly of the Eyes and Ears, Defluxions, or Catarrhs. Their Uſes.

II. To aſcertain the proper Place of the Scalp for making theſe Iſſues, the antient Phyſicians[e] direct to ſhave the Head, and then to meaſure with two Threads, one extending from the Noſe to the Neck, and the other a-croſs the firſt to each Ear: By which means the Point where the Threads touch, or croſs each other, will denote the Place where the Coronal and ſagittal Suture meet; and is therefore the fitteſt Place for making your Iſſue, as you may ſee in the Figures of Scultetus, *Tab.* XXVI. Meekren, *Obſ. Cap.* V. and Deckers, The proper Seat of theſe Iſſues.

[a] Scultetus, *Obſ.* 34. [b] See a remarkable Inſtance in Meekren, *Obſ. Chir. Cb.* V.
[c] See Decker's excellent Method in the Amauroſis and Epilepſy. *Exercit. Pract.* p. 109.
[d] Slevoglius Diſſert. of an Iſſue in the coronal Suture, as a Cure for a decayed Memory.
[e] See Celsus, *Lib.* VII. *Cap.* 7. *N.* 15.

Exercitat.

Exercitat. Pract. pag. 110. But after all, it must be owned, that this Method of assigning the Place, or Meeting of the Sutures, cannot be certainly relied upon, because of the great Variation there is in this Respect in different People. Nor is it of any Consequence whether your Issue be made exactly over the Meeting of the Sutures or not; since the Matter discarged by it in both Cases, comes rather from the external Integuments of the Cranium, than through the Sutures from the Brain, as the Antients falsely imagined. It was also a Notion equally wrong, that the Antients entertained of this Part of the Cranium being thinner, and more perspirable, than the rest. Though it must be confessed, that Infants, whose Bones are not completely ossified, have this Part soft and membranous, which is usually termed in them, the *Fontanel*, or open Mold: Yet in Adults, this upper Part of the Cranium is almost constantly ossified like the rest of the Skull, and frequently the Bones are even harder or thicker here than in other Parts. But these we find were the groundless Reasons, which induced the Antients to make their Issues upon the Meeting of the Sutures. But if the Surgeon will be scrupulously exact in this Respect, he may pretty certainly discover the Meeting of the Sutures, without the forementioned *Apparatus*, of measuring by Threads, if he well considers the Course of them in dry Skulls, and feels carefully with his Finger upon the Scalp and Pericranium. For in most Patients the Meeting of the Sutures is sensible to the Touch, either by a small Cavity or Protuberance; upon either of which you may venture to make your Issue.

The Methods of making Issues in the Scalp.

III. To render Issues in this Part more efficacious, they are usually made by the actual Cautery. In order to which the upper Part of the Scalp is first to be shaved, and then the red-hot Iron is to be strongly pressed by your Hand, so as to burn through the Integuments upon the Part assigned, till you come to the Bones, or naked Cranium. The cauterizing Iron for this Operation may be of two Kinds: The first of which is without a Case, as we have given you a Figure of it in *Tab.* III. *Fig.* 9. taken from MEEKREN and DECKERS; the other, taken from AQUAPENDENS and SCULTETUS, is furnished with a Steel Case, or directing Tube, as we have represented it in *Tab.* XV. *Fig.* 1 and 2. But that the Force of the Cautery may not be extinguished by the Integuments before it has reached the Cranium, it may be convenient for the Surgeon, first to make an Incision either longitudinal[a] or cruciform through the Skin, and opening the Lips of the Wound, insert the Tube at *Fig.* 2. that, by pressing the Cautery, *Fig.* 1. through it, you may at the first Time burn into the very Bone[b]. But in whatever manner you make the Issue in this Part, it must be immediately dressed afterwards with a Pea dipt in some digestive Ointment, to be retained by a square Plaster and the four-headed Bandage, applied as we shall direct in treating of Bandages. For the rest, you may consult what has been before said of Issues in general at *Chap.* XIX. preceding. In order to credit the good Effects which many able Physicians affirm they have experienced from this Sort of Remedy, in many obstinate Disorders of the Head, it must be considered, that though there is no immediate Discharge hereby made of pernicious Humours from the Brain, yet the Cauterization makes so strong a Revulsion,

[a] See CELSUS, *Lib.* VII. *Cap.* 7. *N.* 15.

[b] Thus MEEKREN, in his Figure, expresses an Incision before the Application of the Cautery; but says nothing of it in the Description.

and

and the Pain it excites gives so strong a Stimulus to the Vessels, as frequently to remove Obstructions, and the inveterate Pains they have occasioned, even in one Instant. For more concerning the Uses of Issues in this Part, the Reader may consult, besides the forementioned Authors, MARC. DONATUS, *Lib.* II. *Hist. Miral. Cap.* 4. M. A. SEVERINUS, *Pyrotech. Chirurg. Lib.* II. *Part* I. *Cap.* 6. RIVERIUS *Cent.* II. *Obs.* 93. AQUAPENDENS, *Oper. Chirurg. Cap.* 1. CLAUDINI *Responf. de Cauterio in Sutura Coronali*, &c.

CHAP. XXXIX.

Of ARTERIOTOMY *in the* TEMPLES.

I. ARTERIOTOMY, as the Word imports, is the Apertion of an Artery with a sharp Instrument, in order to extract a proper Quantity of Blood, for the Recovery of a Patient; performed almost in the same Manner as bleeding in a Vein. Though this Operation is not so often performed at present with us, as it was formerly among the antient Surgeons, for fear of the profuse Bleeding, or an Aneurism, which may be occasioned by wounding this Vessel; yet, if it be well adapted to the Patient's Disorder, and skilfully performed, it may be very often of the greatest Service, and yet not attended with any bad Consequences. We read of the Apertion of Arteries made by the antient Physicians in various Parts of the Body; as in the Forehead, Temples, behind the Ears, in the Occiput, betwixt the Thumb and Fore-finger, &c. where-ever the smaller Arteries lie fair for Incision, so that their Pulsation may be perceived by the Finger through the Skin. But among the modern Physicians and Surgeons we hardly ever meet with this Operation performed in any other Parts but the Temporal Arteries, which may be opened by the Lancet without much Difficulty or Danger, as they lie very near the Skin, so as generally to be very perceptible to the Touch; and, being resisted by the *Os frontis*, on which they are incumbent, they may be very easily compressed, to prevent any profuse Hæmorrhage, or dangerous Aneurism. But even here every prudent Surgeon must own, it is much more difficult to make a fair Apertion of an Artery, than of a Vein; because they seldom appear visible through the Skin, and then you have no other Guide but their Vibration on the Finger. We shall not here enlarge upon the extraordinary Artifices which we read to have been used for Arteriotomy by the antient Surgeons, because they are now obsolete. We shall, in this Place therefore, only describe the Operation with its Dressings and Uses, as they at present obtain among our modern Surgeons and Physicians. Arteriotomy described.

II. First, the Patient must be seated conveniently with his Head inclined to either Side against the Light, that the Surgeon may the better discover the Artery, in order to which he had best place the two foremost Fingers of his left Hand upon the Artery, at a little Distance from each other, as he will be directed by its Pulsation; and observing well the Course or Direction of it within that Space, to dip the End of the Lancet carefully into it betwixt his two Fingers. But it will be here necessary to incise deeper, as the Vessel lies lower, than in Phlebotomy. You must also inlarge your Incision more, by elevating the The Method of Operating.

the Point of your Lancet as you draw it out: Nor need you be afraid of cutting the Artery quite in two; for it will not be attended with any bad Conſequences after Compreſſure and Deligation. If now the Blood follows your Lancet in a very florid and ſalient Stream, ſtarting at every Pulſation of the Veſſel, you may be ſatisfied the Artery is well opened: Otherwiſe you muſt repeat your Inciſion, till your Lancet has either divided or opened the Artery, which you may know by the forementioned Signs. But as the ſmall and thin Point of the ordinary Lancet may be eaſily broke off againſt the Bone, I have experienced the Scalpel, *Tab. I Fig.* G. to be more convenient; eſpecially if your Inciſion be downward and not upward. But to do the Patient any conſiderable Service by this Evacuation, you ſhould bleed him plentifully; that is, to take about a Pound of Blood, or a Pound and half, or more, if he be plethoric, otherwiſe your Operation will be of little or no Benefit. Therefore we need the leſs wonder at the Practice of the Antients, whoſe Method was to bleed the Patient in this Manner till he fainted. If you are deſirous of opening an Artery in the Occiput, or behind the Ears, rather than in the Temples, your Operation may then be conducted in the Manner we have now deſcribed.

Deligation. III. When a ſufficient Quantity of Blood has been taken, your Deligation muſt be made with three ſquare Compreſſes, each larger than the other; laying on the ſmalleſt firſt, in which muſt be included a Farthing, a bit of Lead, or a Pellet of chewed Paper, to compreſs the wounded Artery againſt the ſubjacent Bone. Your other two Compreſſes being laid over the ſmalleſt according to their Size, they muſt be there firmly retained and ſecured by the *Faſcia nodoſa*, which we ſhall deſcribe at large when we come to treat of Bandages at the latter End of our Surgery. The Head thus properly inveſted with your Bandage, muſt continue ſo at leaſt a Week or eight Days before you take it off, to prevent a profuſe Bleeding, or an Aneuriſm: And if the Deligation ſhould, within that Time, get too looſe, it muſt be tightened again, and continued till the Cure is completed.

The Uſes of Arteriotomy. IV. The Uſes of Arteriotomy are ſo many and conſiderable, that not a few Phyſicians reccommend it as the laſt Refuge in many Diſeaſes of the Eyes, and the moſt obſtinate Diſorders in the Head, from whence the Patient will often find Relief when all other Means have been tried in vain; eſpecially when they are cauſed by too great a Fulneſs of Blood. Experience can beſt teſtify the good Effects of Arteriotomy in Vertigos, obſtinate Head-achs[a], Epilepſies, Suffuſions, and Inflammations of the Eyes, and moſt of the other plethoric Symptoms which attack theſe Parts. But particularly in Apoplexies, it has been lately demonſtrated, in a profeſſed Treatiſe on the Subject[b], to be the moſt effectual and expeditious Method of relieving the Patient. I ſhall therefore leave the prudent Reader either to countenance or condemn the Opinion of thoſe who think *Ar-*

a LANZONUS confirms the good Effects of Arteriotomy in obſtinate Head-achs, Madneſs, Epilepſies and Diſeaſes of the Eyes, *Ephem. Nat. Cur. Cent* III. p. 142. It is alſo approved by BARBETTE, and much extolled by SEVERINUS, particularly in the Epilepſy. In a moſt obſtinate Cephalæa I have found it effectual.

b By CATHERWOOD, entitled, *A new Method of curing Apoplexies*; notwithſtanding which, the Operation has been twice performed by me on two apoplectic Patients, the one an old and the other a young Man, but without the expected Succeſs; for they both died ſoon after, though the Operation was made in the Beginning of the Diſorder, and aſſiſted with other proper Remedies; from whence we ſee, that *Arteriotomy* will not always cure Apoplexies.

teriotomy

teriotomy too dangerous to be put in Practice, and even then of no more Use than Veneſection: Since the Uſes and Effects of it are atteſted by the Obſervations and Experience of our beſt Phyſicians, and the Danger of it may be totally removed by proper Compreſſes and Deligation; yet, I muſt own, that, with regard to the Reputation and Character of a young Phyſician or Surgeon, it may be generally adviſeable to defer this for the laſt Help, in Caſes which will admit of Delay. After all, it will be equally neceſſary to aſſiſt this, as well as many other Operations in Surgery, by ordering a proper Diet, Regimen, and Medicines adapted to the Patient's Diſorder, if we expect to make any conſiderable Cure.

CHAP. XL.

Of the HYDROCEPHALUS.

I. HYDROCEPHALUS is a preternatural Diſtention of the Patient's Head to an uncommon Size by a Stagnation and Extravaſation of the Lymph: Which, when collected within-ſide the Bones of the Cranium, the *Hydrocephalus* is then termed *internal*; as it is *external*, when retained betwixt the common Integuments and the Cranium. The firſt Kind of the Diſorder is ſeldom to be met with but in Infants, who contract it whilſt they are in the Womb, or in a difficult Birth. Among others, the Reader may conſult, on this Head, WEDELIUS, *De Morb. Infant.* pag. 47. and RUYSCH, *in Theſaur. Anat.* II. *Tab.* III. which laſt has given a very ample Account of this Diſorder. It generally appears in the Infant whilſt young and new-born: But if it has advanced to any great Degree, it is a dangerous Caſe, and generally incurable. For if you make a Paracenteſis in the Head, to diſcharge the Lymph, your Operation is no ſooner performed, but the Infant dies, as Phyſicians have been too often well aſſured by Experience. If the Diſorder be in its firſt Stage, and but beginning to ſhew itſelf, it will be moſt adviſeable to try what may be done by Medicines; ſuch as gentle and repeated Purges, to draw the Humours downward with corroborating Medicines internally. Externally you may apply to a good Purpoſe a large Compreſs round the Head, dipt in warm *Aq. Calcis & Sp. Lavend. vel Aq. Reg. Hungar.* This Compreſs muſt be retained by a proper Bandage, termed the *Reflex Capeline*, which is deſcribed in the *Third Part* of our Syſtem treating on Bandages. The internal Hydrocephalus.

II. In the external *Hydrocephalus*, as we obſerved, the Humours are lodged betwixt the external Integuments and the Cranium. Hence you may diſtinguiſh this Species by the Softneſs of the Head and Skin externally. But in the internal *Hydrocephalus* the Head feels as hard as uſual, though it is much more diſtended and enlarged: The Reaſon of which Appearances is manifeſt from what we ſaid in the laſt Paragraph. Though the external *Hydrocephalus* is not without Danger, yet it may be much more readily cured than the internal Species; but the more difficultly as it is of a longer ſtanding. The Cure muſt be attempted as well by internal as external Remedies at the ſame Time. Apply Cathartics, Diaphoretics, Diuretics, attenuating and ſtrengthening Medicines for internal Uſe: And externally, a Compreſs dipt in the Fomentation beforementioned for the internal *Hydrocephalus*. Or, you may apply thoſe Waters and The external Hydrocephalus.

Spirits to the Head, together with discutient Caps or Bags filled with the Tops of dry *Majorana*, *Origanum*, *Serpillum*, *Pulegium*, *Chamomilla*, *Salvia*, *Rorismarina*, *Lavendula*, *&c.* warming them before you secure them on the Head by the proper Bandage. HILDANUS writes, that he happily cured an *Hydrocephalus* barely with the repeated Application of *Aqua Calcis* as a Fomentation by means of a Sponge. To the forementioned Remedies we may add an Errhine, or cephalic Snuff, composed *ex summit. Marjoranæ*, *Lil. conval. Mari veri*, *Hippocastan*, *Nicotiana*, *&c.* Add to these the repeated Chewing of Tobacco in the Mouth, to discharge the Serosities from the Head by Spitting. Lastly, some foment the Head with the Fumes of burning Spirit of Wine highly rectified. But if all these Means prove unsuccessful, Recourse must then be had to chirurgical Helps: Among which, you ought, first, to try a large Blister, applied behind the Ears, on the Occiput and Neck. If this does not altogether answer your Intention, you may add Scarification and Cupping upon the same Parts. PISO relates, that he cured a Man of an *Hydrocephalus*, by making Issues in the Neck: And therefore Setons, one of which will effect as much as two Issues, may be here also highly serviceable. When all other Means have been used in vain, some of the Antients advise a deep transverse Incision to be made at the Bottom of the Head or Occiput: Which I cannot approve of, as it may easily wound, or even totally divide, the Blood-vessels and Muscles there seated. But as this Danger may be avoided by deep Scarification and Cupping upon the same Parts, the Discharge that way may be equally serviceable, and much more commodious. The Parts scarified are to be afterwards dressed with Lint, spread with some digestive Ointment: adding sometimes a little *Præcipitatum rubrum*, to keep up the Discharge. When the Disorder is thus removed, you heal it up with some vulnerary Balsam, keeping the Patient, for a considerable Time, in a Course of proper internal Medicines, and under a suitable Diet and Regimen. Histories of this Disorder are given in PAREY, LUSITANUS, KERKRINGIUS, and others. But particularly VESALIUS relates, that he found nine Pounds of Serum in the Verticles of the Brain, in a Subject who died with an *Hydrocephalus*, *Anat.* Lib. I. Cap. 5.

CHAP. XLI.

Of TREPANNING *the* CRANIUM.

When the Trepan is necessary.

I. TREPANNING is universally understood to be a Perforation, or Opening made in the Bones of the Cranium by a kind of *Terebra*, or round Saw, which has its Name from the *Greek* Word τρέω, and by the *Latins* called *Modiolus*. This Operation was performed by the Antients, not only in Fractures and Depressions of the Cranium, but also in those other obstinate Disorders of the Head and Brain, which could not be relieved by internal Medicines, and the Use of Issues upon the coronal Suture: By which means they thought to give a more immediate Vent to the offending Humours. But the modern Surgeons never use the Trepan at present for internal Disorders of the

Head [a]; though they seldom neglect it in Fractures and Depressions of the Cranium, caused by Blows, Falls, Bullets, and other external Injuries. They also frequently apply it in Fractures and Fissures of the Cranium, to discharge extravasated Humours, which, by injuring the Brain, might occasion the Death of the Patient. The Trepan is therefore useful, not only in these Cases, to elevate the depressed Parts of a fractured Bone in the Cranium, for which you may consult *Part* I. *Book* I. *Chap.* XIV. but also the most fatal Symptoms, and Death itself are avoided, by discharging the extravasated Blood through an Aperture made by this Instrument. It is well known, that the Bones of the Cranium are often fissured, and the adjacent Blood-vessels, lacerated by external Injuries, without any apparent Fracture or Depressure of them; so that if the extravasated Blood be not removed by the Trepan, by pressing on the Brain it will greatly injure, if not totally destroy its several Functions. The Consequences of neglecting this Instrument in such Cases will be Restlessness, Delirium, Convulsions, Vertigo, Apoplexies, Stupidity, with a Loss of the Senses, Speech, and voluntary Motion, and at last Death itself. Sometimes only the milder of these Symptoms appear, and in but small Degree, when the Head has been injured by external Violence: But in some time afterwards, when the Blood or Humours have been accumulated, the most fatal Symptoms do then gradually approach, and even threaten the Life of the Patient. But if Death is not the immediate Consequence, as there is no natural Vent for the extravasated Blood or Lymph, it must consequently putrify, and, by corroding the Brain and its Membranes, will inevitably destroy the Patient in a little Time, if it be not prevented by a judicious Application of the Trepan, for discharging the offending Matter. This Instrument therefore ought never to be neglected in urgent Cases of this Nature.

II. The less Time you lose, the better, before the Application of the Trepan: But in the Operation itself you must go on slowly and carefully. For it is extremely difficult, if not impossible, for you to take out a Piece of the Cranium by this Instrument, without injuring the subjacent *Dura Mater*, to which it is most intimately attached, so as to be often in some Degree wounded, though you use the greatest Circumspection. For this Reason I am induced to condemn the Advice of those [b], as very unsafe, who direct to trepan the Cranium immediately upon every slight Disorder of it. I should therefore advise you, with CELSUS, and most of the Moderns [c], to try first the Use of other Remedies, both external and internal, as Phlebotomy, Purging, Clysters, discutient Bags, *&c.* rather than immediately to subject the Patient to the Trepan, before you are convinced it is absolutely necessary [d]. But you may see more upon this Head in *Part* I. *Book* I. *Chap.* XIV. *Sect.* XXXVI, *& seq.* where we treat of Wounds in the Head. On the other hand, there are many Cases, in which

The Trepan not to be used hastily.

[a] Though indeed there is an Instance related in the *Mem. Acad. Paris. Chirurg.* where an obstinate Head-ach was cured by Trepanning, *Tom.* I. p. 226. But there follows another, p. 227. where the Operation failed in a similar Case.

[b] See FIENUS *De Trepanatione*, and BOHNIUS *De Trepanationis Difficultatibus*. Likewise ROONHUYS, *Obs.* I. p. 1.

[c] Among which are CÆSAR MAGATUS, Lib. II. *De Vulneribus*, Cap. 41. and DIONIS in *Chirurg. Operat.*—CELSUS, Lib. VIII. Cap. 4.

[d] See some excellent Observations on the Use of the Trepan in dangerous Cases, *Mem. Acad. Chirurg. Gallic.* Tom. I. p. 188.

Delay may be of the moſt fatal Conſequences; where, being convinced of the Inſufficiency of other Remedies, you ought immediately to have Recourſe to the Trepan, in order to elevate or remove the depreſſed or fractured Parts of the Cranium, and to diſcharge the Humours extravaſated internally.

The Event of the Operation doubtful.

III. The Surgeon can hardly ever be certain of the Succeſs of this Operation: Becauſe he cannot be previouſly aſſured in what Manner or Degree the Brain, and its including Membranes, are injured, the Diſorder generally turning out worſe than its Symptoms indicated. Therefore we need the leſs wonder that moſt Patients miſcarry after the Uſe of the Trepan, not from the Operation, but the Violence of their Diſorder, or the Injury received. And ſome there are, who, being much better after the Operation, appear ſeemingly in a fair Way for Recovery, and yet miſcarry beyond all Expectation. Upon Enquiry made after the Cauſes of this unexpected Diſappointment, and ſudden Death of the Patient, they appear chiefly to be two: Either from, 1. an Inflammation or Suppuration of the Brain and its Membranes, from the Putrefaction of ſome Blood or Matter that could not be diſcovered or diſcharged; or, 2. from ſome Inſult of the Blood on the Parts affected, by Irregularities committed by the Patient in the Non-naturals, either in Drinking, and bad Diet, (or by an unwholeſome Air[a]) or by Frights, Anger, Venery, or other intenſe Paſſions, *&c.*

What Parts of the Cranium may be trepanned, and what not.

IV. But before we proceed to acquaint the young Surgeon with the Method of performing this Operation, it will be previouſly neceſſary to point out to him, upon which Part of the Cranium it may be convenient for him to apply the Trepan. And, in general, the Place where the Fiſſure appears, will be moſt convenient for the Trepan, if nothing contra-indicates. But, in Fractures, it will be proper to trepan a little below the injured Part, that the extravaſated Humours may be more eaſily diſcharged: Yet, if the Fragments of the Bone can be removed, ſo as to make Way for the Extraction of the Blood and Splinters which injure the Brain, the Uſe of the Trepan may be in that Caſe neglected. It muſt be next obſerved, that there are ſeveral Places in the Cranium, which ought not to be in any Caſe trepanned: As, 1. upon the Sutures where the Bones meet with each other, eſpecially upon the ſagittal Suture, as HIPPOCRATES has long before obſerved; becauſe, in theſe Parts, the *Dura Mater* is more ſtrongly attached to the Cranium, and under the ſagittal Suture runs the longitudinal Sinus of the *Dura Mater*, which, by trepanning in this Place, might eaſily be injured, to the Hazard of the Patient's Life. Yet, in Caſes of urgent Neceſſity, the Trepan may be uſed upon the coronal Suture, and ſometimes upon others. Inſtances of which may be ſeen in CARPUS, *Lib. de Fract. Cranii*, HILDANUS, *Obſ.* I. *Cent.* 2. 2. It is equally dangerous to trepan the Cranium in the Middle of the *Os Frontis*, eſpecially in that Part which forms the Fontanel: Becauſe under theſe is ſeated the forementioned Sinus of the *Dura Mater*, which might eaſily be wounded by the Inſtrument. 3. The Trepan muſt not be applied upon any of the Sinuſes of the *Os Frontis*. 4. Nor ought it to be uſed where any large Vein or Artery ſpreads itſelf. 5. If the fractured Part of the Bone, upon which you fix the Trepan, is looſe or carious, you might then injure the Brain by this Inſtrument. 6. It has been judged improper to trepan

[a] It has been obſerved by the *French* Phyſicians, that Trepanning has failed in many Hoſpitals, on account of the Impurity of the Air. *Mem. Acad. Chirurg.* Tom. I. GUILLEAM. alſo relates, that this Operation generally proved fatal in *Paris*, though ſucceſsful in other Parts of *France*.

in

in the lower Parts or Basis of the Cranium, which are invested with Muscles, as about the Occiput and Temples: Though the Moderns find that the Trepan may be very well used, and even applied upon the lower Parts of the Cranium, and upon the temporal Bones, after the Muscles have been freed from them [a]. 7. Lastly, it will be improper to trepan upon the cruciform Eminence of the *Os Occipitale*. Notwithstanding these Rules or Cautions, if a violent Fracture should happen in or near the forementioned Places, you ought to trepan as near to the affected Part as possible: And if the Fracture has passed a-cross the Sutures, you must trepan within a Finger's Breadth of the Suture on each Side. Sometimes it is impossible to discover the particular Part of that Cranium, which is injured; the Patient, in the mean time, being afflicted with the most urgent and dangerous Symptoms, such as Vomiting, Drowsiness, Convulsions, Fever, Bleeding at the Nose and Mouth, with the Loss of his Senses and Speech. In these Cases, it will be necessary to trepan first on the Right Side, then on the Left, afterwards upon the Forehead, and lastly, upon the Occiput, and so round till you meet with the Seat of the Disorder. For it is much better, in these desperate Cases, to try a doubtful Remedy, that none at all, as CELSUS [b] rightly advises, that the Surgeon may not be accused of having neglected any thing which might conduce to the Recovery of the Patient. You must not think it a new or uncommon Practice to make several Perforations in the Cranium after one another by the Trepan: For, in many Cases, we meet with extravasated Blood or Splinters of the Bone, which require the Use of the Trepan in other Parts, besides where the Wound itself manifestly appears. Therefore the Operation must be repeated, till you can discover and remove the Cause of the Disorder: So that it is no Wonder to meet with three or four, nay seven or twelve Perforations in the Cranium, made by the Trepan, in the same Patient. Of which we are furnished with many Instances, particularly in SCULTETUS, *Obs.* 7. GLANDORPIUS *Speculum Chirurg. Obs.* 3. p. 46. to which add DIONIS in his Operations, and many others. But what is more, we read of the Trepan being applied twenty-seven different Times with Success upon a Count of NASSAU, in STALPART. VANDER WIEL, *Cent.* 1. *Obs.* 8.

V. After having pitched upon the Part to be trepanned, your next Business is, to shave the Scalp, and make an Incision through the Integuments, to lay bare the Cranium, except it should have been already done to your Hand by the Wound. The Incision of the Integuments may be made in the Form of a Cross +, or in the Figure of the Letter X, V, or T, large enough to admit the Crown of the Trepan upon the Bone. After your Incision is thus made, you must elevate and separate the Integuments and Periosteum from the Cranium by the Edge and Handle of the Scalpel: And having wiped off the Blood, you must insert a large Quantity of scraped Lint, to dilate the Wound, and compress the divided Vessels, in order to diminish the Hæmorrhage, which indeed, though profuse, may, in many Patients, be serviceable. A Compress must be next applied, dipped in *Sp. Vin. Aq. Calc.* or *Sp. Vin. Camphorat. calid.* to be retained by the Kerchief Bandage. Thus the Patient is to be left, if the Dis- Provision for the Operation.

[a] See ROUHALT *De vuln. Cap.* p. 91. & seq. and SAVIARD, *Obs.* 27. p 136.

[b] In *Lib.* II. *Cap.* 10. To which we may add the Sentence of HIPPOCRATES in *Aphor.* vi. Sect. 1. *Desperate Disorders require desperate Remedies.*

order

order will permit, for a few Hours, that the Blood may be ſtopped before you apply the Trepan: Otherwiſe the Work will be ſo much obſcured, that you cannot ſee what you are about. Yet if any Delay will be dangerous, you ought to apply the Inſtrument immediately: Before which, if the Hæmorrhage be great, you may ſecure the Ends of the divided Arteries by Ligature with a crooked Needle and Thread. But if you are in great haſte, the Hæmorrhage muſt be ſuppreſſed for the preſent by the Fingers of an Aſſiſtant preſſed upon the Part.

Apparatus of Inſtruments and Dreſſings.

VI. We come now to the Apparatus of Inſtruments and Dreſſings, which muſt be provided before you enter upon the Operation, The firſt and principal is the Trepan or Terebra, with its Crown, *Tab.* XV. *Fig.* 3. Some of the Antients uſed a Trepan made in the Shape of a common Gimlet, according to the Figures of FABRICIUS AB AQUAPENDENTE, ANDREAS A CRUCE, and SCULTETUS (*in Officina Chirurg.* pag. 14, & ſeq.) *Tab.* II. *Fig.* 7, &c. which Inſtrument they applied with one Hand; from whence it was uſually denominated the Hand-Trepan. But, as this Inſtrument labours under many Defects, which renders the Application of it leſs commodious, the Moderns, at preſent, uſe a [a] Trepan like that preſented in *Tab.* XV. *Fig.* 3. with a Handle turning round, like that uſed by Coopers, which is much more commodious than the antient one; eſpecially if the Crown of it be not made cylindrical, but broader above than below, in the Shape of an inverted Cone, as it is repreſented in *Fig.* 3. A. By which means the Inſtrument, meeting with more Reſiſtance as it deſcends further through the Bone, is not ſo liable to ruſh in upon and wound the Brain. The Inſtrument contrived in this Manner is, by ſome, termed the Trepan of HILDANUS, though it was known and deſcribed by CELSUS [b], and others of the Antients, long before HILDANUS. The Crown of this Inſtrument, marked A, is joined to the lower Part of the Handle B, by a Screw, ſo that it may be taken off and put on at Pleaſure: Or elſe, that a Crown of another Size may be ſcrewed in its Place, ſince it will be neceſſary for the Surgeon to be provided with Crowns of different Sizes. The Connection of the Crown, with its Handle, is, by ſome of our modern Surgeons, made in a different Manner from that here repreſented, but with no great Advantage, in my [c] Opinion; ſince that of the Make here repreſented, is found to anſwer moſt Purpoſes conveniently enough. The Trepan is diſtinguiſhed into Male and Female: In the firſt of which the Crown is furniſhed with a ſharp Point or Pyramid A. But when the ſaid Point or Pyramid, *Fig.* 4. is taken out by the Winch, *Fig.* 5. the Trepan is then termed Female. You muſt next be alſo provided with a Scalpel of a particular Make, with a round and flat Head, as repreſented at *Fig.* 6. which is, by ſome, denominated the lenticular Scalpel: To which add another Inſtrument for gradually depreſſing the *Dura Mater*, of the Shape repreſented at *Fig.* 7. You muſt be alſo provided with a perforating Inſtrument, *Fig.* 8. which muſt be ſcrewed into the Cavity B of the Handle *Fig.* 3. Alſo a Hair Bruſh, like that repreſented at *Fig.* 9. with a ſmaller Terebra or Wimble, like that in *Tab.* VII. *Fig.* 7. a Lancet, an Elevator, *Tab.* VII. *Fig.* 7, 8, and 14. a Tooth-pick made of

[a] See alſo AMB. PAREY, *Lib.* IX. *Cap.* 18. where he gives ſuch a Figure of the Crown of this Inſtrument.

[b] *Lib.* VIII. *Cap.* 3.

[c] *Vid.* GARENGEOT *Tract. de Inſtrument.* Tom. I. pag. 115.

a Quill,

a Quill, a Probe with a ſharp Point, ſome Doſſils of Lint: And, laſtly, a Veſſel with ſome *Spirit. Vin. rect.* all which are to be placed in order in a large Diſh or Plate, that they may be ready to the Surgeon's Hand in performing his Operation. The Apparatus of Dreſſings and Bandage to be applied after the Operation, conſiſts of a Doſſil of Lint of an orbicular Figure, which muſt be tied round the Middle with a Piece of Thread, about a Span long, the Form of which is repreſented in *Tab.* XV. *Fig.* 11. Beſides which, there muſt be added another round Bundle of Lint of a convenient Size, ſecured by a Thread like the preceding, as preſented at *Fig.* 12. You muſt alſo have ſome Pledgits of Lint, *Fig.* 13. for recovering the other Dreſſings, and filling up the Cavity in the Cranium. To theſe add ſome *Mel. Roſar. & Tinct. Succin. vel Maſtich.* ſome ſcraped Lint, a ſquare Compreſs: And laſtly, a large Napkin, or ſquare Piece of Linen, to make the Kerchief or Bandage for the Head. All which Particulars are to be diſpoſed in order upon one or two large Plates, that they may be readily found, and handed to the Surgeon as he wants them.

The Method of Trepanning.

VII. The Aparatus being thus provided, we come next to the Operation itſelf. To perform it with a greater Readineſs and Exactneſs, the Patient muſt be diſpoſed in a convenient Poſture upon a Couch, or ſome other low Seat, in ſuch a Manner, that the Surgeon and Aſſiſtants may have free Acceſs to perform each their Part. This done, and the Dreſſings removed, the Wound is next to be cleanſed from the extravaſated Blood, or other Foulneſs: After which, you place the Head in a convenient Manner upon a Pillow, to be held faſt by an Aſſiſtant. The Surgeon now takes the perforating Trepan, *Fig.* 8. which he adapts to the Handle B, inſtead of the Crown A, *Fig.* 3. ſo that by turning round the Handle D, he makes a ſmall Entrance or Aperture with his Inſtrument, and then applies the Male Trepan with a Crown, *Fig.* 3. A. Upon the Top of the Handle C C, the Surgeon fixes his left Hand, upon which he places his Chin or Forehead[a], while with his Right Hand he ſlowly and carefully turns round the Handle, till the Crown of the Trepan, with its Spindle, have made a circular Entrance deep enough in the Cranium. Then he removes the Spindle, and continues his Work carefully with the Crown of the Trepan only, as long as he ſees convenient, all the Saw-duſt being firſt bruſhed off from the Cranium and the Teeth of his Inſtrument with Bruſhes of Hog's Briſtles. He now continues to uſe the Trepan till the Saw-duſt becomes bloody, which denotes, that he has penetrated the Diploë, or intervening ſpongy Part of the Cranium. But it is to be obſerved, that he will not always meet with this Sign, becauſe in ſome Sculls the Diploë is wanting in the Part trepanned. However, when his Saw duſt becomes bloody, the Inſtrument muſt be directly laid aſide, and, after waſhing away the Blood with a Sponge dipt in *Sp. Vin.* he then ſcrews the ſmall Terebra, *Tab.* VII. *Fig.* 7. B, by two or three Turns, into the ſmall Aperture in the Middle of the trepanned Piece of Bone, and then takes it out again, making two or three more Turns with the Crown of his Trepan.

[a] Moſt Surgeons formerly placed their Forehead upon their left Hand, on the Inſtrument; but it ſeems to be a better Practice to lean the Chin as M. PETIT and GARENGEOT direct; becauſe then the Operator has a better View of his Work.

Then

Then he examines with a Probe or Tooth-pick, whether the Plates of the Cranium are ſufficiently ſawed through; which cannot be better known, than by carefully attending to the Colour of the circular Groove or Diviſion: For when that appears of a blue or grey Colour, which was before white, it is a Sign, that you have penetrated ſo far through the lower Plate of the Bone, as to render the *Dura Mater* almoſt conſpicuous through it. The Trepan muſt therefore now be applied with greater Circumſpection, leſt the Saw-Teeth of its Crown ſhould ruſh in upon and wound the *Dura Mater*, which might be attended with violent Inflammation and the moſt malignant Symptoms. But if the bony Plate appears livid in one Part of the circular Groove, and white in another, it is a Sign that the Trepan has not cut equally through; and therefore it muſt be inclined and preſſed a little harder upon the whiteſt Parts, moving round the Handle ſlowly and carefully, till the Saw-Teeth of the Crown have cut deep enough to make the round Piece of Bone looſe or moveable. In that Caſe it will not be convenient to cut totally through the Bone with the Saw-Teeth of the Trepan. To avoid wounding the ſubjacent *Dura Mater*, you ſhould rather ſcrew in the Terebra again, *Tab.* VII. *Fig.* 7. B, or ſome ſuch Inſtrument, till you find that by pulling this upward with the Aſſiſtance of an Elevator, you can totally remove the round Piece of Bone.

The Treatment after Trepanning.

VIII. Having thus extracted the round Piece of the Cranium, the Blood uſually follows it: Which being wiped off, the Surgeon is carefully to examine, whether there are any Fragments or rough Parts remaining to be extracted, or Depreſſions to be raiſed. If there are, you muſt do it immediately: If not, you muſt ſmooth the rough Parts about the lower Margin of the Aperture, by applying the headed Scalpel, *Fig.* 6. to prevent the *Dura Mater* from being pricked and injured by any of the ſharp Splinters. This done, the Blood will more readily diſcharge itſelf: But to promote its Exit, you may gently incline the Patient's Head on one Side and another, tenderly and carefully preſſing the *Dura Mater* itſelf, either by the Head of the Scalpel, *Fig.* 6. or the Depreſſor, *Fig.* 7. By which means the Patient is no ſooner relieved from the Weight or Preſſure of the extravaſated Blood on his Brain, but he inſtantly begins to recover his loſt Senſes, either ſuddenly or by Degrees, like one juſt awoke out of a deep Sleep. When the Patient has thus recovered his Senſes, and the Blood notwithſtanding is in ſome meaſure retained, the Surgeon ſhould direct him to fetch a deep Breath, and hold it with a Strain, like one that has a hard Stool. Others rather recommend violent Sneezing, provoked by Sternutatories, in order to force out the extravaſated Blood: The Succeſs of which, in my Opinion, muſt be very precarious, if not ſometimes fatal.

When extravaſated Blood, or a bony Fragment or Splinter are lodged under the *Dura Mater*.

IX. If the *Dura Mater* appears diſtended or elevated, and of a blackiſh blue Colour at the trepanned Aperture of the Cranium, it is uſually a Sign that Blood or Matter are retained underneath it. Therefore there remains but one and a doubtful Remedy for it. Which is, to make a Perforation through the *Dura Mater* (as alſo the *Pia Mater* when the Matter lies ſo low) with a Lancet or Scalpel, to give Vent to the retained Blood or Matter, which will otherwiſe certainly prove fatal to the Patient, by eroding ſome of the larger Blood-veſſels. I know there are ſome, who think the *Dura* and *Pia Mater* cannot be perforated without deſtroying the Patient, and therefore they forbid it.

it. But the Succeſs of this Practice, if you avoid the larger Arteries and Veins, is confirmed, not only from my own Experience, but likewiſe the Authorities of [a] PAREY, [b] GLANDORP, [c] COITER, [d] FALLOPIUS, [e] MAGATUS, [f] MARCHETTI, [g] ROHAULT, [h] BLANCARD, and other creditable Writers, who teſtify, that many have had this Operation performed without Danger. If you meet with any bony Fragments or Splinters which irritate and wound the Brain, they muſt be carefully extracted, either by your Fingers or the Pliers: Or if any Parts of the Bone are depreſſed only, you muſt raiſe them by your Fingers, a Lever, or an Elevator adapted to the Purpoſe. When a Splinter is inſinuated betwixt the *Dura Mater* and the *Cranium*, ſo that you cannot extract it by the firſt Aperture you made with the Trepan, a ſecond or third Perforation muſt be made by the ſame Inſtrument, till you have removed every thing injurious to the Brain and its Meninges. Sometimes it will be neceſſary to cut off or remove the bony Fragments, by making a ſecond Perforation into the firſt, like a half Moon, by the Trepan when the Fragments are ſtrong, or by the ſmall Saw (*Tab.* VII. *Fig.* 9.) by a Pair of cutting Forceps, or laſtly, by the Mallet and Chiſſel, to be ſeen in the ſaid *Tab.* VII. But, when the Fragments are thin and weak, you may remove them by the lenticular Scalpel, *Tab.* XV. *Fig.* 6. that you may afterwards extract or remove the vellicating Splinters. When there is a long Fiſſure in the Cranium, you may trepan upon each End of it: But when the Fiſſure runs in ſeveral Directions, you muſt trepan upon each, becauſe every one of them has uſually extravaſated Blood or Matter lodged underneath [i].

Deligation and Dreſſings.

X. Having deſcribed the Method of perforating the Cranium by the Trepan, and of diſcharging the extravaſated Blood, Matter, and bony Fragments, we next proceed to the Dreſſings and Deligation. Theſe are made, firſt, with a round Pledgit of dry Lint, *Fig.* 11. to be laid next the *Dura Mater*, with a Thread faſtened to it, and hanging out of the Aperture, that it may be placed under and drawn out from beneath the Cranium: Upon which Pledgit of Lint is afterwards poured ſome *Mel. Roſar.* diluted with a little *Sp. Vini*; though there are ſome who recommend the Application of *Tinct. Maſtich. Succin. &c.* which are, in my Opinion, too ſtrong and acrid, becauſe they often moleſt the Patient with violent Pain. You then lay on a like Pledgit of Lint, furniſhed with a String, as in *Fig.* 12. with other Doſſils, till the Cavity is replete. In the next Place, the Cranium and Wound itſelf muſt be dreſſed with Lint, ſpread with ſome mild digeſtive Ointment, or *Mel. Roſar.* upon which add a ſquare Compreſs dipt in warm *Sp. Vini*, or *Sp. Vini Camphorat. cum Aq. Calc.* and then you ſecure the whole, without a Plaſter, by the Capeline or Head-Bandage, deſcribed in the End of our Surgery.

Of renewing the Dreſſings.

XI. In the ſubſequent Dreſſings, which muſt be repeated once or twice every Day, you muſt ſtrictly avoid fat and oily Applications; which will deſtroy the Membranes and foul the Bones: Inſtead of ſuch, you muſt apply balſamic and healing Topics,, eſpecially *Mel. Roſar. cum pauco Sp. Vini*, *Tinct. Maſtich. &c.*

[a] Lib. ix. Cap. 21. [b] *Obſ. Chirurg.* 4. [c] *Obſ. Anatom. & Chirurg.* [d] *De vuln. Capit.* Cap. 18. [e] *De vuln.* Lib. ii. Cap. 42. [f] *Obſ.* 14. [g] *Pag.* 83. 116. [h] *Obſ. Med. Phyſ.* Cent. 1. *Obſ.* 27.

[i] The *French* Surgeons have deſcribed, and illuſtrated with Obſervations, a great Variety of Caſes, where a frequent Repetition of the Trepan was requiſite. *Mem. Acad. Reg. Chirurg.* Tom. I. p. 251. *& ſeq.*

The Wound being thus conſtantly dreſſed and attended, you will have an Exfoliation of a thin Plate from the trepanned Margin of the Bones, uſually within forty or fifty Days, which ought not to be pulled away by Force. Your Exfoliation being obained, there will then appear new Fleſh and Callus, ſhooting up from the clean Bone and *Dura Mater*, ſo as at length to fill up the whole Cavity. By that Time you find the Cavity about half filled, you muſt moderately compreſs the ſprouting Fleſh and Callus by ſcraped Lint and Bandage, to prevent it from being too ſoft and lax: And when it is arrived even with the Surface of the Bones of the Cranium, you muſt endeavour to conjoin and extend the Integuments over it, by the Aſſiſtance of Sticking-Plaſters; that the new-formed Subſtance may intimately unite with the ſuperinduced Skin. This new-formed Subſtance, with which the Cavity in the Cranium is filled, becomes gradually more and more indurated: But ſo as even at laſt to reſemble rather a Cartilage than a Bone, which, upon boiling the Cranium, ſeparates, and falls out from the other Bones. And it is from the weaker Reſiſtance of theſe cartilaginous Places that ſuch as have been trepanned are ſubject to Diſorders and Pains in their Heads, upon a Change made in the Weight and Temper of the Atmoſphere: Though that Inconvenience may be partly remedied, by conſtantly keeping the Place armed with a Plate of Silver.

The Removal of Accidents.

XII. If a Vein ſhould open itſelf ſo as to bleed profuſely after the Operation has been performed with the Trepan, then you muſt ſprinkle on ſome *Pulv. ex Bolo Armeno, Sang. Dracon. Thure & Colophon. &c.* compreſſing the Part for ſome time with Lint. But if the Brain or *Dura Mater* ſhould be inflamed, you muſt apply diſcutient and cooling Topics externally, *Aq. Flor. Samb. cum pauc. Gutt. Sp. Nitri Dulc.* the Patient muſt alſo uſe Abſtinence, with Phlebotomy, and cooling diluent Medicines internally. Even ſome (as ROHAULT, p. 123.) recommend Scarification of the *Dura Mater* itſelf, before the laſt preſcribed Mixture is applied. But, if a Suppuration ſhould follow, ſo as exactly to form an Exulceration, the Surgeon muſt cleanſe away the Matter, or Sordes, with ſcraped Lint, or by an Injection mixed with *Mel. Roſ. Sp. Vini & Tinct. Maſtich. Succin. vel Elix. prop. ſine alcali vel acido.* If, after the Patient has been once trepanned, he perceives great Uneaſineſs and Diſorder in ſome other Part of the Head, it is a Sign there ſtill remains ſome foreign Body to be removed. Therefore the Trepan muſt be again applied upon the aſſigned Place. If any ſpongy Excreſcence, or proud Fleſh ſhould riſe up above the Level of the Wound upon the Cranium, it may be removed by ſome of the following Methods: Either by ſtrong Depreſſion with Lint dipt in *Sp. Vin. vel Tinct. Maſtich.* and a tight Bandage, or by applying the round Piece of Lead, *Fig.* 14. contrived by BELLOSTE[a], and is, by ſome, made perforated, and furniſhed with Handles, as at *Fig.* 15. which is to be put into the Aperture of the Cranium, and well covered with round Pledgits of Lint: But you will ſeldom have Occaſion for this Inſtrument, if the firſt Method be uſed. Or, laſtly, if the Excreſcence has already ſurmounted the Surface of the Cranium, it may be cut off, either by tying it round with a Thread, or with a Pair of Sciſſors, and the reſt may be taken down with *Vitriol. Cærul. Pulv. Sabin vel Alum. uſt.* and for the future you muſt make a ſtricter Compreſſure and Deligation with more com-

[a] See his Treatiſe, entitled, *Le Chirurgien d'Hoſpital.*

pact

pact Dossils of Lint. By which means the sprouting Excrescence will be not only compressed and reduced, but the Wound itself will readily heal in a little Time. We have an Account of the Trepan being repeated to the eighth Time for a Caries in the Cranium, *Mem. Chirurg.* Tom. I. p. 262. There is another, of a successful Operation on the coronal Suture, and the Repetition of it, p. 255. But in p. 244. it is advised to omit it. Le Dran also has many curious Observations on Trepanning. As to the Abuse of it, consult Roonhuys in his Observations.

CHAP. XLII.

Of Extracting Bodies fallen into the Eyes.

Things to be extracted from the Eyes.

I. IT is no uncommon Thing for the Eyes to be molested with a bit of Glass or Sand, a Splinter of Wood, or from off a Quill, or the Toe or Finger-Nails, and sometimes by little Insects, or caustic and pricking Bodies of various Kinds; which, by slipping into this tender Organ, we daily experience will produce excruciating Pain and Inflammation. To remove these, and prevent their bad Consequences, the Surgeon's Aid is often required: Whose chief Business is, to discharge the foreign Body as soon as possible, by some of the Means we shall hereafter prescribe.

Methods of Expulsion.

II. The first and most easy Method of discharging these Substances, is, by agitating and extending the Eye-lid with one's Fingers, holding the Head down at the same time: By which means the increased Flux of Tears, excited by the vellicating Body, very often washes the same out of the Eye, without much Difficulty. But if this Method does not succeed, the next Remedy is, to blow some levigated Pearl or Crabs-claws through a Quill under the Eye-lid; that, as these are washed out by the Tears, they may also take away the foreign Body with them. Otherwise the Surgeon must take the small round Head of a slender Probe, or a little Pair of Pliers, the End of a Tooth-pick, *&c.* and extending the Eye-lids gently from the Eye, carefully search for, and tenderly extract the offending Body. There still remains a very easy and certain Method for removing these injurious Substances from the Eyes, by dipping a Pencil-brush of soft Feathers, or a bit of fine Sponge fastened in a Quill, in warm Water, by which you may brush them out from betwixt the Eye and its Lid. Lime, or any acrid Salt, and such like Substances, may be washed out by warm Water, or Milk, either by injecting them, or with a Feather or bit of Sponge. When the foreign Body is removed, the Surgeon must furnish his Patient with a cooling anodyne Collyrium *ex Aq. Rosar. Damasc. cum albumine ovi conquassata, & pauxillo Saccar. Saturni, vel Lap. Tutiæ præparat.* with which the Eye is to be frequently washed; not neglecting to bleed the Patient at the same time, if there be any considerable Inflammation.

CHAP. XLIII.

Of TUBERCLES *and* EXCRESCENCES *on the* EYE-LIDS.

Kinds. I. THE preternatural Tubercles, which we frequently meet with upon the Eye-lids, are of various Sorts and Sizes. If the Tubercle be small, hard, red, immoveable, and seated upon the Eye-lid above the *Cilia*, or Range of Hairs, it is then denominated by the *Greeks*, *Crithe*, and by the *Latins*, *Hordeoleum*, from its supposed Resemblance to a Barley-corn. This Tumor is included in a Kind of Cyst, which, by Inflammation, degenerates into a thickish Matter: From whence frequently proceed intense Pains and various other Disorders of the Sight. The Seat of the *Hordeoleum* varies, being sometimes immediately next to the Skin, and sometimes within-side the Eye-lid, under its Muscle. When the Tubercle is moveable, 'tis usually denominated *Chalazium*, or a Stithe. Some are termed *Grandines*, as being like Hail: Others are named *Hydatides*, being Vesicles replete with watery Humour. Sometimes several Species of the encysted Tumors are formed upon the Eye-lids, as the *Atheroma*, *Steatoma*, and *Meliceris*: Of which we have already treated in *Chap.* XXVIII. preceding. It may be here observed once for all, that almost all the Tubercles on the Eye-lids are of the encysted Kind, some having a small depending Basis, and others a broad one, as may be seen in *Tab.* XV. *Fig.* 16, 17, 18.

Prognosis. II. We are, from the Importance and Obviousness of this Organ, obliged to undertake the Cure and Removal of many of these Tubercles: Which, in other Parts of the Body, might be very well neglected. Yet we ought not, even here, to call in the Assistance of the Knife, when they are very small, and not troublesome to the Sight; for they are often tolerable without Danger, though they may perhaps give a little Deformity. 'Tis remarkable, that these Tubercles seldom give Way to topical Remedies: Nor should you be over-forward with the Use of emollient Cataplasms, which are recommended by some; because the Eye itself may be injured by them, and therefore Extirpation is to be preferred.

Cure. III. Almost all Tubercles of the Eye-lids, which do not hang pendulous by a small Root, are removed by making an Incision through the Integuments by the Scalpel, so as to avoid wounding the Tumor, in order to take it clean out, as we before directed for encysted Tumors in *Chap.* XXVIII. foregoing. But if the Coats of the Tumor are wounded, or adhere very firmly to the adjacent Flesh, so that it cannot well be extirpated whole by the Scalpel, it may be cut out as far as you well can by a Pair of small Scissors; and the Remainder eroded and cast off by dressing with *Ægyptiacum*, or some other digestive Ointment, mixed with *Præcipitat. rub. vel Lap. infernal.* After which you may complete the Cure with Balsams, as in other Wounds. In some Cases, when I think the Tumor cannot be totally extirpated, I make an Incision through its including Cyst, together with the common Integuments; and, after expelling or discharging its Contents, destroy the rest with Digestives and Caustics, as I directed for encysted Tumors. But here you must be very careful to prevent any of the Caustic from falling into the Eye, which might greatly injure, if not

destroy

deſtroy its Sight. But we are furniſhed with a much more ready and eaſy Way of removing thoſe Tubercles of the Eye-lids, which hang pendulous by a ſmall Root, as at *Fig.* 17 and 18. which is, either to cut them off inſtantly by a Pair of Sciſſors, or elſe gradually by a Ligature with a Silk Thread. But another Method muſt be taken with the *Hordeolum:* Becauſe that, contrary to moſt encyſted Tumors, is uſually attended with Pain and Inflammation. Therefore in theſe laſt it will be proper, firſt, to try to diſperſe them by diſcutient Applications: And if that will not ſucceed, to bring them to Suppuration before they are inciſed. It will greatly conduce to diſperſe and eaſe the Pain of an incipient *Hordeolum*, if the Patient frequently foments it with his faſting Saliva, or elſe with a Mucilage *ex Sem. Cydonior.* or the Pulp of a roaſted Apple mixed with a little Saffron and Camphire. If none of theſe ſucceed, but the Tumor holds on its Inflammation, and begins to turn yellow, you may ripen and break it with a *Diachylon* Plaſter, or a Mixture of Honey and Meal. But the Cure of it will be ſooner completed, if you invert the Eye-lid, by Inciſion with a Scalpel a-croſs the Tumor, ſo as to ſeparate the Skin of the Eye-lid, and extract the Cyſt entire, if it be hard; otherwiſe you may open the Cyſt, and diſcharge its included Matter, and deſtroy the Remainder by Digeſtives: By which means you will avoid an unſightly Scar in the Eye-lid, and the Wound itſelf will heal without the Application of other Medicines.

CHAP. XLIV.

Of WARTS *on the* EYE-LIDS.

I. THE Eye-lids are frequently moleſted as well with Warts as the forementioned Tumors, which often both obſtruct the Sight, and disfigure the Eye: For which Reaſons the Patient is deſirous of their Removal. Theſe Warts adhere to the Eye-lids, either by a broad or ſlender Baſis; and may be extirpated either by the Knife, Ligature, or Cauſtics, in the Manner we directed for Warts in general, in *Chap.* XXVI. preceding. You muſt never apply the actual Cautery to deſtroy theſe Warts, as you may for thoſe in other Parts of the Body: Nor ſhould you apply Cauſtics but with the greateſt Circumſpection; leſt, if any Part ſhould ſlip into the Eye, it might greatly injure, or deſtroy the Patient's Sight[a]. If a Wart on the Eye-lid appears blackiſh, or livid, you will generally have Reaſon to fear its turning cancerous, as it will do, eſpecially if irritated with Inſtruments or Medicines. For this Reaſon, theſe are uſually termed, *Noli me tangere*, by the moſt expert Oculiſts: So that it is beſt to leave this Species of Warts to themſelves. I happily removed a large Wart from the upper Eye-lid by Ligature, which had no broad Root, but impeded the opening of the Eye-lids: The Figure of which Wart you may ſee in *Tab.* XV. *Fig.* 17. A.

[a] Thus TIMÆUS à GULDENKLE, *Lib.* I. *de Affect. Capit. Cap.* XXI. relates the Caſe of a Surgeon, who blinded a Woman by endeavouring to remove a Wart from her Eye-lid by the cauſtic Juice of Spurge.

CHAP.

CHAP. XLV.

Of Relaxation and Tumor of the EYE-LIDS, *termed* Phalangosis *and* Ptosis.

Nature of the Disorder.

I. WE frequently meet with the Eye-lids either tumified, or relaxed to such a Degree, as greatly deforms the Eye, and impedes its Vision. Sometimes the relaxed Eye-lid subsides in the Manner represented by *Fig.* 19. *Tab.* XV. occasioned either from a Palsy of the Muscles, which sustain and elevate the Eye-lids, or from a Relaxation of the *Cutis* above, from various Causes. Sometimes an œdematous or aqueous Tumor is formed on the Eye-lids, so as almost entirely to exclude Vision: Which last Case should be well distinguished from the former, and may be remedied, without much Difficulty, by the Use of internal and topical Medicines. Such are Purges with Diuretics and Sudorifics inwardly; and a Compress dipped in warm *Sp. Vin. Camph. & Aq. Calc.* externally. But, in the paralytic or relaxed Case, you must use nervous and cardiac Medicines, and apply a little *Balf. Peruv. cum Aq. Reg. Hungar.* &c. If these Medicines should all miscarry, the best and most expeditious Method is, to extirpate a sufficient Quantity of the relaxed *Cutis*; and, after healing up the Wound, the Remainder may become sufficiently shortened.

The antient Method of Cure.

II. The Antients contracted the Skin thus relaxed, by extirpating Part of it with the Assistance of a Ligature with a Needle and Thread. Having first carefully secured it by Ligature, by passing the Needle through the Bottom of the Skin, they then cut it off close to the Ligature: Which, in many Cases succeeded very well. Sometimes they first amputated Part of the relaxed Skin by the Scissors or Scalpel, and then secured the Wound, either by Ligature or Suture, with a Needle and Thread, as we read in HIPPOCRATES, (*Lib. de Vict. acut. Sect.* 66.) CELSUS *Lib.* VII. *Cap.* 7. *N.* 8.) and PAULUS ÆGINETA *Lib.* VI. *Cap.* 8. But the Hæmorrhage frequently proves so large in this last Method, as to obscure the Wound, and render it impossible to make a neat Suture, or Ligature: To avoid which Inconvenience, the famous *German* Oculist, BARTISCHIUS, formerly contrived a wooden Instrument, *Tab.* XV. *Fig.* 19. B B. to intercept the redundant Part of the *Cutis*, and, compressing it by turning the Screw D D, so as to obstruct the Blood-vessels, and hinder the Circulation, the intercepted Part mortified in a few Day's time, and cast itself off.

The modern Treatment.

III. But as the last mentioned Practice of BARTISCHIUS was attended with great Pain, Inflammation, and other Inconveniences; VERDUYN has much improved upon him, by making almost a similar Instrument of Brass, but with Perforations in its upper and lower Plates, as in *Tab.* XV. *Fig.* 21. By which Instrument the redundant *Cutis* is not only compressed, but also secured with a Ligature, by passing a Needle and Thread through the Apertures, and leaving about four or five Inches of the Thread hanging down on each Side; you then amputate the redundant Skin, close to the Edge of the Instrument, with a Scalpel, or Pair of Scissors: After which you remove the Instrument, and make a Ligature with the Threads. Having performed your Operation, the Wound is, for the first Time, to be dressed with some vulnerary Balsam and scraped Lint: But, in the subsequent Dressings, you may spread your Lint with some

digeſtive Ointment, to be retained with Compreſs and Bandage, as we directed in other Wounds of this Part. After a few Days, when the Lips of the Wound appear to be pretty well cloſed or conjoined, you may then cut the Ligature, and carefully extract the Threads, removing them, not all at once, but one at a Time, in each Dreſſing, and compleating the Cure with ſome vulnerary Balſam and Plaſter. You may cauterize the Wound before the Removal of the Inſtrument, which will not only ſuppreſs the Hæmorrhage, and render the Diſorder leſs liable to return again, but may perhaps, at the ſame time, ſave you the Trouble of making a Ligature or Suture. Sometimes this Diſorder is ſo great, as to deſtroy the Figure of the Eye, or ſo obſtinate and inveterate as to return again, after a repeated Performance of the Operation; which renders the Caſe incurable. Laſtly, we may obſerve, that RAW invented an Inſtrument, not much differing from the former in its Make and Uſes; (ſee *Fig.* 22.) but you may ſee the original Invention of this Inſtrument highly controverted between him and RUYSCH[a], who rather attributes it to ADRIANSONIUS.

CHAP. XLVI.

Of the Trichiaſis, *or Inverſion of the* EYE-LIDS; *in which the Hairs irritate the Eyes.*

I. THE *Cilia*, or Margins of the Eye-lids are ſometimes inverted, ſo as greatly to irritate the ſenſible Coats of the Eye, and bring on intenſe Pains and Inflammation; which, without timely Aſſiſtance, may greatly injure, if not totally deſtroy the Sight. This Diſorder is, by the *Greeks*, termed *Trichiaſis*, or *Diſtichiaſin*, *hairy*; and ſometimes *Entropion*, *Inverſion*, becauſe herein the Lids and their *Cilia*, or Hairs, are inverted, ſo as to offend the Eye. The Diſorder is generally occaſioned from an irregular Cicatrix formed from a Burn, the Small-Pox, an Ulceration, or Wound from ſome external Injury. Sometimes a Relaxation of the Skin, and a paralytic Diſorder of the Eye-lids, deſcribed in the preceding Chapter, make one of the chief Cauſes of a *Trichiaſis*. Nor is the Cure of a *Trichiaſis* to be effected without much Difficulty, eſpecially when the Diſorder is become inveterate. Cauſe of the Diſorder.

II. 'Tis hardly poſſible for the Surgeon to remove this Diſorder, ſo as to prevent its returning, without exirpating the offending Hairs: Which every one muſt allow to be no eaſy Operation, that has ſeen any thing of the Diſorder. For if you cut the Hairs cloſe off, it will be to no Purpoſe, becauſe the rigid and ſharp-pointed Stumps of the Hairs will ſhoot up and irritate the Eye worſe than the Hairs did before. Some indeed endeavour to cure the Diſorder, without extirpating the Hairs, by clearing them out from the Eye, and keeping them folded back, or paſted on the Outſide of the upper and lower Eye-lids by ſome ſticking Plaſter. But this Practice is not often attended with the deſired Effect; becauſe the Motion of the Eye-lids looſen the Hairs, and they become again inverted, ſo as to offend the Eyes, as before. In this Caſe therefore the Practice of ſome is conformable to the Advice of CELSUS (*Lib.* VII. *Cap.* 7. *N.* 8.) who directs to burn out the Roots of the Hairs, one by one, with a Method of Cure.

[a] See RUYSCH *Epiſt. Anat.* XIII. and RAVIUS *in Tract. de Septo Scroti.*

ſlender,

ſlender, but broad-pointed Needle of Steel, in the Shape of a *Spatula*, heated red-hot. But ÆGINETA (*Lib.* VI. *Cap.* 13.) directs to extract each Hair firſt with a Pair of Pliers, before the Cauterization of their Roots; which is an Operation ſo painful, that the Patient will hardly ſubmit to it. Therefore ſome chuſe to fill up the Cavities at the Roots of the Hairs, after their Extraction with *Lap. infernal.* or ſome other Cauſtic, taking great Care that no Part of it ſlips into the Eye. Or it will be better to touch their Cavities with a ſmall Pencil-bruſh dipt in *Sp. Salis Ammoniaci cum Sp. Vini rectificatiſſ.* by which means they will cicatrize and cloſe up, without producing any more Hairs. When there are many injurious Hairs to be thus extracted, it will be better to remove them at ſeveral Times, than all at once: Otherwiſe you may induce too great Pain and Inflammation on the Eye, whoſe *Cornea* ſhould be alſo defended from the Cauſtic or Cautery here uſed by a ſmooth hollow Plate of Lead, Wax, or Horn, adapted in the ſame Manner as for artificial Eyes. If the Diſorder ſhould ariſe from a Relaxation of the Eye-lids, it will be neceſſary to treat it in the ſame Manner we directed in the preceding Chapter.

Other Methods. III. But if all the Hairs of the Eye-lids are thus inverted, and the Patient will not permit them to be extracted by the Roots, and to be afterwards treated with Cauſtics; there then remains but one, and a lamentable Method of removing the Diſorder, by amputating the *Cilia*, or cartilaginous Margins of the Eye-lids themſelves: Which the Patient had better ſubmit to, notwithſtanding the Deformity it may occaſion, rather than be blind. After the Operation, a *Collyrium* ſhould be made, and applied *ex Aq. Roſar. alb. Ovor. & pauc. Sacchari Saturni, vel Aquâ & Sp. Vini ana*; and the Wound muſt be treated in the ſubſequent Dreſſings with ſome Balſam till it be healed. But lately CORTUMIUS, in a profeſſed Diſſertation *de Trichiaſi*, under Profeſſor GOELICKE, 1724, has propoſed a new Method of removing the *Cilia*, rather by Cauſtics with *Lap. infernal.* than by Amputation. When the Patient is laid on his Back, he directs firſt to arm and defend the Eye with Lint or Leather; and then to rub the *Cilia* with ſtrong *Lapis infernalis*, till the cartilaginous Margins of the Eye-lids with their Hairs, are eroded and removed: After which you are to dreſs firſt with dry Lint, and then with a *Collyrium ex Aq. Roſar. & Alb. Ovor.* to be often renewed. The next Day you muſt remove the Lint, or leathern Defenſative from the Eye, to avoid an Inflammation from it: And, if any ſmall Eſchar ſhould be formed underneath the ſame, it may be removed by ſome digeſtive Ointment. By which means, if you clear the Eye well from the Lint, he aſſerts that the Wound will be cured generally within the Space of ſix or eight Days.

CHAP. XLVII.

Of the Ancyloblepharon, *or* CONCRETION *of the* EYE-LIDS.

Deſcription. I. THE Diſeaſe termed *Ancyloblepharon*, is when the Eye-lids cohere, or grow to each other, or to the Eye itſelf. It is eaſily diſtinguiſhable from the glewing up of the Eye-lids in the Small-Pox and Inflammations, by an Inſpiſſation of the Juices and glutinous Matter, by which they are ſtrongly faſtened

faſtened together for ſome Time, but without intimately concreting, becauſe they ſeparate again ſpontaneouſly in a little Time afterwards.

II. Sometimes the Eye-lids cohere, ſo that they cannot be opened, to admit the Light for Viſion, either in one or both of the Eyes, as in *Tab.* XV. *Fig.* 23. AA. Sometimes again the Eye-lids grow to the Globe of the Eye itſelf, either to its *Tunica cornea*, *Albuginea*, or both. Which Accidents generally ariſe from violent *Ophthalmias*, Burns with Gunpowder, or other Fire, the Small-Pox, cauſtic Remedies, or an Ulceration of the Parts from many other Cauſes. 'Tis true, this Diſorder is ſometimes born with the Infant; and may ſometimes ariſe in Adults from a fleſhy Excreſcence in the Angles of the Eyes growing to the Eye-lids, as I had once an Inſtance myſelf. See *Miſcell. Nat. Cur. Dec.* II. *Ann.* 8. *pag.* 135. Cauſes.

III. The Cure of all the ſeveral Species of this Diſorder is, in ſome Meaſure, both doubtful and dangerous, but of none more than that in which the Eye-lids are conjoined to the *Cornea*: For in that Caſe it will hardly be poſſible to free them without blinding, or at leaſt injuring the Patient's Sight. Nor is there leſs Difficulty to free the Eye-lids from each other, when they cohere from a Burn. Therefore in all Burns and Ulcerations of the Eye-lids, great Care ſhould be taken to treat them with emollient and cooling Topics, and to keep them free from Adheſions, to which all inflamed and excoriated Parts are extremely ſubject. When the Eye-lids grow together in the Small-Pox, they generally adhere at the ſame time to the *Cornea*, from whence they cannot eaſily be ſeparated without injuring the Sight. For, after the adhering Parts have been freed from each other with the greateſt Judgment and Caution, there are almoſt conſtantly ſome little Scars or Specks left upon the *Cornea*, which greatly impede the Sight for the future, and which it will be almoſt impoſſible to remove. *Prognoſis.*

IV. From what has been ſaid concerning the Nature of the Diſorder, you will readily conclude, that the Cure muſt conſiſt in a ſkilful Separation of the conjoined Parts. In order to which, the Patient is firſt to be placed on a Bed or Chair againſt the Light, in the moſt convenient Poſition for the Operator; who is firſt to examine whether the Eye-lids are totally conjoined, or whether there may not be ſome ſmall Interſtice left, which you will generally meet with in the greater or internal *Canthus* of the Eye next the Noſe. If the Eye-lids are ſtrictly conjoined in every Part, you may then begin to make your Diviſion in either of the *Canthi*, or Angles, which appears to be moſt convenient; but with a ſoft Hand, and great Circumſpection, to avoid wounding the *Cornea*, or Eye itſelf. When you have made a ſmall Aperture, a Pair of Sciſſors, or Scalpel, with a blunt Point, are to be introduced, with which (*Tab.* XV. *Fig.* 25.) you gradually and carefully divide the Lids from each other. But if there is naturally left a ſmall Aperture betwixt the Eye-lids, where they do not adhere, you may then immediately introduce one of the forementioned obtuſe-pointed Inſtruments, and proceed to make your Inciſion: Or, if you have none that are obtuſe-pointed, introduce a ſmall grooved Director, *Tab.* XV. *Fig.* 24. and then you may ſafely divide with the common Sort of Sciſſors, Scalpel, or a Lancet. Cure.

V. When the Eye-lids have been carefully ſeparated from each other, you muſt then examine with a Probe, whether they adhere to the Eye itſelf: If they do, you muſt again free them cautiouſly with an obtuſe-pointed Scalpel or Lancet. Adheſions of the Globe.

cet. But when the whole Globe, or the greater Part of the Eye is firmly attached to the Lids, the Operation is both difficult and dangerous; as it will be almoſt impoſſible to free the *Cornea* without injuring the Sight: Which Accident may be avoided, and the Cure more eaſily obtained, when the Lids adhere only to the *Albuginea tunica* of the Eye. Even Wounds of the laſt mentioned Tunic are of ſo little Conſequence, that I would always chuſe rather to cut off Part of that in dividing them, than to leave Part of the internal Membrane of the Eye-lid adhering to it: For the internal Membrane of the Eye-lids cannot be amputated without inducing great Injuries on the lacrymal Gland and Duct. Therefore it is highly neceſſary for this Operation, to be performed by an expert and ſteddy Hand.

Treatment after the Operation.

VI. When the Lids have been freed from the Globe of the Eye, the next Buſineſs is, to prevent them from joining again; which they will certainly do, if not prevented by interpoſing ſome Lint, or a thin Plate of Lead, Wax, Leather, or a bit of Gold-beater's Skin, cut in the Shape of a Half Moon, and moiſtened with *Ol. Amygd. dulc.* Either of theſe are to be left ſeveral Days in the Eye, till there is no Danger of future Adheſions: And if they ſhould fall, or be taken out, they muſt be again replaced in a ſhort Time. If the Patient cannot bear the Interpoſition of the forementioned Plates, as is ſometimes the Caſe, he muſt then frequently agitate and work round his Eye-lid, at Intervals, after having uſed a Collyrium *ex Aq. Plantag. Lap. tutiæ pp. & Sacc. Saturni*, or a Powder prepared *ex Saccuaro, Margaritis & Lap. Cancror.* And, laſtly, the Surgeon himſelf muſt ſometimes paſs the obtuſe End of a Probe betwixt the Lids and the Globe of the Eye, to free and keep them from Adheſions.

Adheſionsin the Small-Pox.

VII. When the Eye-lids are glued together by a gummoſe and inſpiſſated Matter in the Small-Pox, and Inflammations of that Organ, ſo that they cannot eaſily be opened; they ſhould never be forcibly pulled aſunder, but be firſt moiſtened a conſiderable Time with warm Milk, and other emollient Topicals: By which Means the Patient will generally be able to open the Eye himſelf ſoon after.

CHAP. XLVIII.

Of the EVERSION *and* GAPING *of the* EYE-LIDS, *termed* Ectropium *and* Lagophthalmia.

Origin of the Diſorder.

I. WHEN the Eye-lids are everted or retracted, ſo as to ſhew their internal or red Surface, and cannot ſufficiently cover the Eye, the Diſorder is then denominated *Ectropium* and *Everſio Palpebrarum*, by the *Greeks* and *Latins*. When the upper Eye-lid only is thus diſordered, it is then denominated *Lagophthalmus, Oculus leporinus*, or Hare-eyed. Some indeed will have the *Lagophthalmia* a Retraction of the upper Eye-lid without any Everſion, ſo that it cannot cover the Eye: Which Accident does alſo happen to the lower Eye-lid, as I have often obſerved, without any Everſion, though it is not mentioned by others as a Species of the *Ectropium*. Sometimes this is a ſimple, or original Diſorder; and ſometimes only a Symptom or Conſequence of another, as an Inflammation, Sarcoma, Tumor, *&c.* When the Diſorder is ſimple, or original, it generally ariſes from a Contraction of the Skin of the Eye-lid by the

Scar of a Wound, Ulcer, Burn, *&c.* or from an Induration and Contraction of the Skin, after an Inflammation; and ſometimes it may proceed in a great Meaſure, from the Uſe of aſtringent *Collyria*, injudiciouſly applied in Diſorders of the Eyes.

II. The Cure of this Diſorder conſiſts in relaxing and elongating the external Skin of the Eye-lid, ſo as to cover the Eye: Which is often no eaſy Taſk to perform, eſpecially when the Diſorder is become inveterate. When the Diſorder is recent, it will be beſt to try the Application of Emollients; ſuch as the Vapours of hot Milk or Water, Oil of Almonds, or Olives, Mucilage of Quince-Seeds, Hare's Fat, *Ung. Dialthææ*, &c. to be continued for ſeveral Days on the Scar or contracted Skin of the Eye-lid; which muſt be often extended either upwards or downwards, according as the Diſorder is either in the upper or lower Lid. When the Patient goes to Bed, it will be proper to bring the Eye-lids cloſe to each other, and to reſtrain them ſo by Plaſter, Compreſs, and Bandage, to be repeated or renewed every Night. But if none of theſe Means take effect, you muſt then have Recourſe to the Operation, when you judge the Caſe curable. Which is performed in the following Manner: Cure by Medicines.

III. Firſt, you make a ſemilunar Inciſion in the external Skin of the Eye-lid, next its Tarſus, or cartilaginous Margin, making the Angles of the Inciſion downward in the upper Lid, and upward in the lower Lid (as in *Tab.* XV. *Fig.* 26. AA.) that, by this Means, the Skin may be elongated. If the Skin does not appear to be let out enough by one Inciſion, you muſt make two or three more, running parallel with the firſt, and about the Diſtance of a ſmall Packthread from each other. When the Eye-lid is thus ſufficiently elongated, you muſt dreſs the Wound firſt with dry Lint ſtuffed into the Inciſions; and then with Lint, moiſtened with ſome vulnerary Unguent, which will both prevent the old Skin from uniting again, and at the ſame time cauſe new Fleſh to ſprout up in the Inciſions, to elongate the Skin. Laſtly, to forward the Extenſion and Cure, a Piece of ſticking Plaſter ſhould be faſtened to the Margin of the Eye-lid, to keep it extended either up or down: Which Method is to be continued till the Eye-lids will ſhut cloſe. Cure by the Operation.

IV. When the Diſorder ariſes from an Inflammation, or fleſhy Excreſcence within-ſide the Lid; you muſt, in that Caſe, firſt, remove the Inflammation by the Remedies we have elſewhere deſcribed for that Purpoſe: And then, after arming the Eye with a defenſative Plate, remove the Excreſcence by *Lapis infernalis*[a]. And thus, by removing the Impediments, the Eye will recover its former Action. When the Diſorder proceeds from an *Encanthis*, *Hyperſarcoſis*, or *Sarcoma*, as in *Fig.* 27, 28, 29. *Tab.* XV. you may remove it by the Directions we ſhall preſently give in the two following Chapters. When the Diſorder is from an Inflammation or a Sarcoma.

V. When the Skin of the Eye-lid has continued violently diſtorted or contracted from the Patient's Birth, there is ſeldom any Hope of curing it. And it is ſtill more impoſſible to obtain a Cure, when the lower Eye-lid is everted through a Weakneſs of the orbicular Muſcle in old People, without any Appearance of a Scar: In which Caſe the Operation will be to no Purpoſe. If any good can be done, it will be moſt likely by corroborating and ſpiritous Medi- When the Diſorder is incurable.

[a] See IVESIUS on this Subject, *Lib. de Morb. Ocul.* See likewiſe ROONHUYS, *Obſ.* 18. & BIDLOO *Exercit.* p. 153.

cines both external and internal. But in general, this Diſorder is always the more obſtinate and difficult to cure, as it is more inveterate, or of longer Standing. We have a learned Diſſertation *de Ectropio* by KECKIUS, *ſub Præſidio* ZELLERI, *Tubing. An.* 1733.

CHAP. XLIX.

Of the ENCANTHIS.

I. WE ſometimes meet with a Tubercle, formed in the greater or internal *Canthus* of the Eye, growing out either from the *Caruncula lachrymalis*, or from the adjacent red Skin: Which Tumor is ſometimes large enough not only to obſtruct the *Puncta lachrymalia*, but alſo Part of the Sight, or *Papilla* of the Eye itſelf [a]. In this Diſorder the Tears continually run down the Cheek, which greatly deforms the Eye and Face, and gives Riſe to an *Ophthalmia*. See *Tab.* XV. *Fig.* 27. A. This Tubercle, denominated *Encanthis* by the *Greeks*, is of two Kinds: The mildeſt of which is that without Hardneſs and Pain: But the moſt obſtinate and malignant Species is livid, and very painful, tending, in ſome Meaſure, to a cancerous Nature.

Treatment of the firſt Species.

II. In the Beginning of the mild Species of the *Encanthis*, it will be highly uſeful to ſcarify firſt, and then to apply ſome mild eſcharotic or cauſtic Medicine: Of which the moſt innocent is a Powder of *Saccar. Canarienſ. & Vitriol. alb. aut Alum. uſt.* in the Proportion of five Parts of the firſt to one of either of the laſt. A little of this Powder being carefully ſprinkled upon the Tumor, is afterwards to be waſhed out of the Eye with warm Water. If this proves inſufficient, you may ſometimes touch the Tubercle with *Lapis infernalis*, but with great Caution. But to turn off the Humours from the Eyes, and prevent a Relapſe of the Diſorder, you muſt have Recourſe to Iſſues or Setons, with Phlebotomy, and cooling Purges. If you find, that the Application of the Medicines takes no Effect, or if the Tubercle is of the malignant Species, you then draw it out either with a Hook, *Tab.* XV. *Fig.* 30, 31. or a Pair of Pliers, or elſe, when it is very large, with a Needle and Thread paſſed through it, and tied together like a Sling for a Handle; by which you muſt gradually and carefully extend and draw up the Tubercle, in order to avoid wounding the Eye itſelf, or the lachrymal Caruncle, which would be attended with very bad Conſequences. For as the lachrymal Caruncle in the greater *Canthus* of the Eye, ſtops and prevents the Tears from overflowing, and running down upon the Cheek, if you was to cut off Part from it, the Conſequence would be a watery Eye, or conſtant Flux of Tears over the Cheek. It is therefore rather better to leave Part of the morbid Tubercle, than cut off any Part of the lachrymal Caruncle: Becauſe any Remains of the firſt may be afterwards cleared away, by Degrees, with Eſcharotics, if you cannot take it off with a Pair of Sciſſors. After an Extirpation of the Tubercle, you muſt apply deterging and healing Medicines, or a Collyrium *ex Lap. Tutiæ, Myrrhæ, &c.* till the Wound is healed.

Treatment of a malignant Encanthis.

III. In a malignant Encanthis, inclining to be cancerous, being hard, livid, and very painful, 'tis generally better to let it alone, and to mitigate its Uneaſineſs with cooling and lenient Collyria, than to exaſperate it by the Opera-

[a] See a Figure of a large *Encanthis* in PURMANNUS's *Chirurgia Curioſa*, pag. 134.

tion,

Fig. 1.
Fig. 2.
Fig. 3.
Fig. 4.
Fig. 5.
Fig. 6.
Fig. 7.
Fig. 8.
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Fig. 16.
Fig. 17.
Fig. 18.
Fig. 19.
Fig. 20.
Fig. 21.
Fig. 22.
Fig. 23.
Fig. 24.
Fig. 25.
Fig. 26.
Fig. 27.
Fig. 28.
Fig. 29.
Fig. 30.
Fig. 31.

tion, or by escharotic Medicines: Otherwise you may perhaps bring on Symptoms worse than the original Disease, as is frequently done in cancerous Disorders by improper Treatment. We have an extraordinary Cure of this Disorder related by Purmannus in his *Chirurgia Curiosa*: In which, after having extirpated the very large Tubercle by Ligature, he applied an actual Cautery to its Root with Success.

CHAP. L.

Of the Sarcoma *and* Hypersarcosis, *or* Excrescence *formed betwixt the* Eye *and its* Lids.

I. RELATED to the foregoing Disorder are those Tubercles, or fleshy Excrescences, on the inner Surface of the Eye-lids, termed by the *Greeks*, *Sarcomata* and *Hypersarcoses*: (See *Tab.* XV. *Fig.* 28, 29.) which, in the Beginning, are usually very small; but by Degrees advance to a considerable Bulk. Some of them are smooth and even surfaced; and some again are rough and unequal like the Rasberry or Mulberry: Of which Excrescences I have seen and cured several. Description.

II. I generally remove these Tubercles, first, by carefully extracting them with a small Hook, *Tab.* XV. *Fig.* 30, 31. and then cutting down to the Root with a Pair of small Scissors. After letting it bleed a while, I order the Patient frequently to wash his Eye with a Collyrium *ex Lap. Tutiæ, Aloeæ & Sacc. Saturn. in Aq. Ros. Solut.* till the Wound is healed. Instead of a Hook you may also extend the Tubercle, by passing a Needle and Thread through it. Some endeavour to remove these Tubercles by Escharotics, and *Lap. infernalis*: But I think Incision to be much safer, as well as more expeditious, and less painful. Cure.

An Explanation *of the* Fifteenth Plate.

Fig. 1. Is an Iron Cautery to make Issues in the Head: A the Handle, B the Cautery.

Fig. 2. A denotes the Cannula to receive and direct the Cautery, *Fig.* 1.

Fig. 3. The *Trepan* which I use. A denotes its *Crown*, B the Place where the Crown is screwed on. C C the upper Part of the Handle, upon which the Hand is laid in the Operation. D the Arch of the Handle by which the Instrument is moved round; E a Spike in the Crown. The Moderns have a Method of fastening the Crown on the Trepan, otherwise than by screwing: but this is my Way.

Fig. 4. Represents the Spike taken out of the Crown.

Fig. 5. Is the Key or Winch, by which the Spike is taken hold of and screwed into the Crown.

Fig. 6. A lenticular Scalpel, with which the rough Edge of the Bone is smoothed after the Use of the Trepan.

Fig. 7. Is a Steel Inſtrument, commonly called a *Depreſſor*, with a flat Button at its End, to preſs down the *Dura Mater*, and diſcharge the latent Blood. The ſame Inſtrument is alſo by ſome termed *Meningophylax*.

Fig. 8. Is a kind of *Terebra* to be faſtened to the Handle at B, *Fig.* 3. after having taken off the Crown, being uſed to make the firſt Entrance for the Spike of the Trepan, and to perforate Bones in the *Spina Ventoſa*; whence it is alſo ſometimes named the *perforating Trepan*; A denotes its Point, B the Screw to faſten to the Handle.

Fig. 9. Is a Hair-bruſh to cleanſe the Teeth in the Crown of the Trepan.

Fig. 10. Is the exfoliating Trepan, which is ſometimes uſed to pare away a carious Part in a Bone. A its Point; B B the Wings which ſcrape the Bone, when the Inſtrument is turned round.

Fig. 11. A Doſſil of Lint, furniſhed with a Thread, for dreſſing the trepanned Cranium.

Fig. 12. A Pledgit, or round Compreſs of ſcraped Lint ſecured with a Thread.

Fig. 13. Is another Pledgit of Lint without a Thread, to fill the Aperture of the Cranium.

Fig. 14. Is the Leaden Plate of BELLOSTE, to defend the Aperture and Dreſſings.

Fig. 15. Denotes the Shape in which the ſaid Plate is to be firſt bent.

Fig. 16. A denotes an encyſted Tumor, or *Atheroma*, in the upper Eye-lid; and B is another in the lower Eye-lid.

Fig. 17. A large flat Wart on the upper Eye-lid, having a ſlender Root, ſo as to fit it for Removal by Ligature with a Piece of Silk.

Fig. 18. Is a *Sarcoma* or Excreſcence on the Outſide of the Eye-lid, with a ſmall Root.

Fig. 19. Repreſents the *Phalangoſis* and *Ptoſis*, or Tumor, and Relaxation of the Eye-lids. A denotes the Diſorder in the Left Eye: B B an Inſtrument contrived by BARTISCHIUS, adapted to remove this Diſorder in the Right Eye: D D a Screw by which the two Arms of the Inſtrument are approximated, or brought together.

Fig. 20. Is an Inſtrument like the firſt, but improved by VERDUYN, and as it is figured by RUYSCH, *in Epiſt. Anat.* XIII. A A and B B denote the two Arms of the Inſtruments without any Perforations, to remove various Turbercles by approximating them by the Screw C C, and moving the Hinge D, by which they are connected.

Fig. 21. Denotes the ſame Inſtrument of VERDUYN, only a little larger, and perforated with many ſmall Holes *a a a a a*, to make a Suture for this Diſorder of the Eyes.

Fig. 22. Is an Inſtrument for the ſame Uſe corrected by RAW, and taken from his *Epiſt. de Septo Scroti*, being made more crooked, and ſhutting differently. A the Manner of paſſing the Needle through its Apertures: B the Thread drawn through to conjoin the Wound of the Eye-lid.

Fig. 23. Exhibits an Eye with the *Ancyloblepharon*, or Concretion of the Eye-lids, marked A A.

Fig. 24. Is a ſmall grooved Director, ſometimes uſeful to divide Concretions of the Eye-lids.

Fig. 25.

Fig. 25. A small Scalpel with an obtuse Point, used in several Disorders of the Eyes.

Fig. 26. Represents the Manner of incising the lower Eye-lid in the *Ectropium*, or *Lagophthalmia*, or Eversion and Retraction of the Eye-lids.

Fig. 27. Represents an *Encanthis*, or Excrescence in the Corner of the Eye near the Nose.

Fig. 28 and 29. Denote a *Sarcoma* and *Hypersarcosis*, or fleshy Excrescence within-side the Eye-lid; that marked A belonging to the lower Eye-lid, and that at B to the upper Lid.

Fig. 30. Represents a small Hook, for elevating and extending those Tubercles, to extirpate them: The crooked Point of which may be made either single or double, as you may see by removing the Gripe B in *Fig.* 31. where C C denote the two Prongs, D D the Handle.

CHAP. LI.

Of BLEEDING *in the* EYES.

I. THOUGH Blood-letting in the Eyes has been, a few Years ago, advanced by the *English* Oculist Mr. WOOLHOUSE, as an Invention of his own; yet it manifestly appears, from various Treatises, that the Operation was both known, described, and practised above an hundred Years before among the *German* Physicians [a]. This Operation is cried up by Mr. WOOLHOUSE, as of greater Consequence than any other Discovery in Physic: He even thinks it preferable to the celebrated Philosopher's Stone [b]. Not a new Discovery.

II. Blood-letting may be successfully used in the Eyes: 1. Whenever those Organs are inflamed; that is, when the Blood-vessels, spent on the White of the Eye, appear much larger and more numerous than usual: Wherein it will often succeed, when other Medicines, and even Phlebotomy, have been tried without their due Effects, and when the Inflammation runs to such a Height as to endanger the Sight. 2. It may be used to Advantage when the *Cornea* is infested with Specks or Abscesses: For, after dividing the Vessels which supply the Disorder, it may be much more easily removed. 3. It may be used when a red Coat or Film grows upon the Eye: For the oftener the Vessels are incised, which nourish the Film, the sooner it will shrink, and disappear. Lastly, 4. it may be used by way of Prevention, when the foresaid Disorders have been removed, and threaten a Return, by the Intumescence of the Vessels in the White of the Eye: In which Case you therefore ought to incise the turgid Veins, and foment them. In what Cases useful.

[a] See MAUCHART, *in Dissert. de Ophthalmoxysi*, pag. 18. FELIX PLATERUS *Prax. Med* 8. Lib. i. *Tit. de Visus Læs.* 1609. pag. 280. & 4*to Basil.* 1656. pag. 238. He is again cited on this Head by M. A. SEVERINUS, *in Medicina Efficaci, Anno* 1682. *edit.* pag. 50. Cap. x. which treats of letting Blood in the Eyes.

[b] See the *Dissertations scavantes & critiques de M.* WOOLHOUSE, pag. 310. and *Dissert. Ophthalm.* pag. 224.

III. There

Method of Operating.

III. There are ſeveral Ways of performing this Operation, of which we ſhall here only relate the chief. Firſt, the Patient is to be ſeated conveniently on the Bed-ſide, or on a Chair, with his Head held in a proper Poſture by an Aſſiſtant: Which done, the Surgeon makes a tranſverſe Inciſion with a Lancet upon the turgid ſmall Veins in the Corners of the Eye, ſo as to open them, or cut them quite aſunder. Some uſe a ſmall Pair of Sciſſors, inſtead of a Lancet, to divide the Veſſels: But, in uſing either of them, the Eye-lids muſt be held apart from each other by the Fingers of one Hand, while the Veſſels are inciſed by thoſe of the other. Some, again, elevate the ſmall turgid Veins with a crooked Needle before they divide them, the Eye-lids being, in the mean time, held aſunder by an Aſſiſtant[a]. But it would be ſtill better to have theſe crooked Needles made thin and double-edged, ſo that they may divide the Veſſels, of themſelves, in the Elevation, without the Uſe of Lancet or Sciſſors. Laſtly, there is no material Objection, why this Operation may not be almoſt as advantageouſly performed by the ſcarifying Inſtrument we ſhall deſcribe in the following Chapter.

What is to be done after the Operation.

IV. The ſmall Veins being thus inciſed or divided, their Diſcharge of Blood ſhould be promoted by Fomentations of warm Water, or a Decoction *ex Euphraſia Hyſſop. Veronica, &c.* frequently applied to the Eye by means of a Sponge, or ſoft Linen Rags. For this Operation will be more ſerviceable, as the Diſcharge procured is more copious. But if once performing it does not ſuffice to remove the Swelling and Inflammation, it may be ſafely repeated two or three Times more; aſſiſting it in the mean time with the Uſe of a proper Regimen, Diet, and Medicines both external and internal. I muſt indeed confeſs, that after having performed this Operation myſelf, on ſeveral Patients, firſt at *Altorf*, and ſince at *Helmſtadt* in *Germany*, I could not poſſibly prevail on them to have it repeated, and it was with the greateſt Difficulty that they were perſuaded to it at all; ſome being deterred from it by fear of loſing their Eye-ſight, and others upon the Account of the great Pain which it muſt neceſſarily inflict on this tender Organ. The Reaſon of its being ſeldom performed on Infants, is the Difficulty of perſuading them to hold their Head and Eyes ſteddy: And the Danger of applying a Lancet, or other ſharp Inſtrument, when thoſe Parts are in Agitation, is very apparent to every one.

Another Method.

V. To this Operation is related that by Inciſion, propoſed in a Diſſertation under CAMERARIUS at *Tubingen*, *Ann.* 1734. for a venereal Ophthalmia: In the moſt violent Symptoms of which Diſorder it is adviſed to make a circular Inciſion in the White of the Eye round the *Cornea*, to diſcharge the ſtagnant Blood, or other Matter diſtending that Membrane, and obſtructing its Veſſels. But whether this is a ſafe and uſeful Practice, or whether it may not be uſed with Succeſs in other violent Ophthalmias, as well as the Venereal, can be only aſcertained by the beſt of Teachers, Time, and Experience.

[a] This is the Method preferred by M. ST. YVES, in Lib. *De Morb. Oculor.* pag. 195.

CHAP.

CHAP. LII.

Of SCARIFYING *the* EYES.

I. SCARIFICATION of the Eyes agrees, in many Reſpects, ſo much with the Bleeding of them, deſcribed in the laſt Chapter, that it is no great Wonder Mr. WOOLHOUSE, though a famous Oculiſt, ſhould confound them one with the other[a]. But I think there is a manifeſt Difference, at leaſt enough for any one to diſtinguiſh betwixt them, becauſe the Parts are different; for the interior Surface of the Eye-lids are here the Subject of Scarification, as well as the White of the Eye, to which the foregoing Operation is confined: And then again they are each of them performed by different Inſtruments, as will preſently appear. Coincides much with the laſt Operation.

II. That Scarification of the Eyes is no modern Invention, is apparent from its having been deſcribed and performed by HIPPOCRATES[b], CELSUS[c], ÆGINETA[d], and others among the antient Phyſicians. But there are ſeveral Reaſons to be offered for its having come into Diſuſe with the Phyſicians of the ſucceeding Ages. It might be owing partly to its ſeeming a difficult, dangerous, and very painful Operation, and partly from their judging it to be of little or no Efficacy, as we find by many of their Writings. However, the firſt that revived the Practice among the Moderns, after it had lain neglected for ſo many Ages, was the celebrated *Engliſh* Oculiſt Mr. WOOLHOUSE. Not a new Operation.

III. To ſcarify the Patient's Eye, he muſt be firſt ſeated on his Chair or Bed in an advantegeous Poſture againſt the Light, with his Head ſecured from moving by an Aſſiſtant: After which the Operator preſſes his Thumb and Fore-finger on the Eye-lids, ſo as to elevate, or open, and turn them outward, that their interior red Surface may come into View; which may be done with moſt Eaſe in the lower Eye-lid. He now takes his ſcarifying Inſtrument in the other Hand, and rubs it backward and forward with great Swiftneſs upon the internal Surface of the Lid, and upon the White of the Eye itſelf, if he thinks proper, and ſometimes even upon the *Cornea*, moving from one Corner of the Eye to the other, ſo as to lacerate the ſmall turgid Veins, and make them bleed plentifully. But this in general is an Operation much ſooner learned from Inſpection, than a verbal Deſcription. Method of Operating.

IV. The Diſcharge of Blood from the ſcarified Veſſels ſhould be promoted as much as poſſible by the Applications propoſed for that Uſe in the preceding Chapter, at *Sect.* IV. which will alſo cleanſe the Eye, and abate its Inflammation at the ſame Time. But, in order to prevent the ſcarified Parts from adhering to each other, they ſhould not be bound up, at leaſt in the Day-time, but the Lids ought to be frequently agitated by the Patient: And if they are bound up at Night, you ought, firſt, to interpoſe a Bit of Gold-beaters Skin, or ſome ſuch Subſtance, to keep them aſunder. Mr. WOOLHOUSE recommends the Interpoſition of three or four Seeds of Clary for this Purpoſe, or rather a Bit of Gold-beaters Skin anointed with ſome Eye-ſalve: For without ſome ſuch Precaution, you will hardly avoid Concretion or Adheſion of the Parts ſcarified. Treatment after the Operation.

[a] See MAUCHART *De Ophthalmoxyſi*, pag. 17. [b] Lib. *De Viſione*. [c] Lib. VI. Cap. 6. N. 26.
[d] Lib. III. Cap. 22. *De Trachomate*.

How long the Scarification muſt be continued, or how often repeated, will belong to the prudent Phyſician to determine, from the particular Circumſtances of the Caſe. But in the mean time it will be highly neceſſary to call in the Aſſiſtance of a proper Regimen, Diet, and Exhibition of both external and internal Medicines; for, by neglecting theſe Helps, your Operation may not only prove ineffectual, but perhaps induce a worſe Diſorder on the Eye. Conſult PLATNERUS's Diſſertation *De Scarificatione Oculorum*, pag. 36, *& ſeq.*

The Inſtruments to be uſed.

V. The Inſtruments uſed by different Authors for this Operation, are various. HIPPOCRATES ſeems to have uſed a Sort of prickly Thiſtle, like the *Atractylis*[a]. Some of the antient Phyſicians ſcarified with a ſmall Steel Raſp in the Shape of a Spoon: See *Tab.* XVI. *Fig.* 5. with which they rubbed the internal Surface of the Eye-lid till it bled, as we read in CELSUS (*Lib.* VI. *Cap.* 6. N° 26.) and ÆGINETA *Lib.* III. *Cap.* 22.) the firſt of which Authors call it *Specillum aſperatum*, and the laſt *Blepharoxyſton*. Others uſe the rough Plant, named by Botaniſts *Equiſetum magis nudum*, which ſeems to be very well adapted to the Intention. Others again recommend the Pumice-ſtone, *Os Sepiæ*, *&c.*

The lateſt and beſt Inſtrument.

VI. But the lateſt and beſt Inſtrument for this Operation is found to be the Beards of Barley or Rye, which are furniſhed with Rows of ſmall Teeth or Hooks denoted by A in *Fig.* 3. *Tab.* XVI. Ten, twelve, or fifteen of theſe Beards are to be cut and tied together by a String, ſo as to reſemble a Sort of Bruſh for Clothes, as in *Tab.* XVI. *Fig.* 4. the Teeth of each Beard or Spike being turned outward all round, their ſlender Ends form a Sort of Handle A, to be held and worked round and acroſs by the Fingers, to ſcarify the Inſide of the Eye-lids, and the Eye itſelf with the Part B. Hence this Scarification of the Eyes is, by the modern Surgeons, not improperly called *Ophthalmoxyſis* or *Blepharoxyſis*.

Its Inventor.

VII. The firſt Contriver of this Bruſh for the Eyes appears to be Mr. WOOLHOUSE, the Oculiſt: Who, though he preached up the great Uſes of his Inſtrument to his Pupils, yet ſtudiouſly endeavoured to conceal it, and its Application, from them. Till, in 1726, M. MAUCHART (preſent Profeſſor at *Tubingen*, and Archiater to the Duke of WIRTEMBERG) his *quondam* Pupil, publiſhed both his Inſtrument and its Uſes, with the Method of applying it. About two Years afterwards, the celebrated PLATNERUS of *Leipſic* explained the whole Buſineſs more at large, in a Treatiſe *De Scarificatione Oculorum:* In which we have the Figure of the Eye-bruſh uſed by Mr. WOOLHOUSE, as you find it repreſented by me in *Tab.* XVI. *Fig.* 4.

Uſes of the Eye-bruſh.

VIII. This Eye-bruſh, or Scarificator, is ſaid by the Author, Mr. WOOLHOUSE to be very uſeful in all Diſorders of the Eyes which require Bleeding: As when the ſmall Veſſels are obſtructed, and the whole Eye inflamed, whether from external or internal Cauſes, as a Blow, Wound, Cataract, Pterygium, Hypopyon, Staphiloma, or the like. In all which Caſes, the internal Surface of the Eye-lids ſhould be chiefly ſcarified, in order to diſcharge the heſitating Blood. And, if I may credit Mr. WOOLHOUSE, this Practice is more effectual in removing Inflammations, induced by external Cauſes, or a Chirurgical Operation, than

[a] See MAUCHART, lib. c. pag. 6, *& ſeq.* PLATNER, l. c. pag. 25.

in

in original Ophthalmias or Inflammations of the Eyes. But in the *Chemosis*, or most violent Inflammation of this Organ, it will be necessary to scarify the Eye itself with this Brush, as well as the internal Surface of its Lids. 2. He assigns the Use of his Brush to be for the Removal of the Pterygium, Abscesses, and white or other coloured Specks and Films on the Eye. For, by scarifying the *Tunica albuginea* of the Eye, and sometimes the *Cornea* itself, or rather the *Pterygium* upon the *Cornea*, the Vessels which supply those Impediments and Blemishes of the Sight are lacerated, and, with the Use of other Medicines, destroyed; and consequently they must, in a little Time, dwindle and disappear. 3. He judges his Instrument highly serviceable in strengthening and recovering a weak or impaired Sight; or even to remove an *Amaurosis*, or Cataract, which are not of any long standing: For, by the strong Stimulus of this Operation, and stagnant Humours are put into Motion, the obstructed or compressed Nerves and Blood-vessels are again opened, and rendered pervious, and the Eye, by that Means, restored to its pristine Vigour. 4. The *Ophthalmoxysis*, or brushing up of the Eye, is very serviceable for the Cure of an *Atrophe*, or *Tabes* of that Organ; as it occasions a greater Influx of Juices to the Parts, which are therefore supplied with more Nourishment. 5. This Operation may contribute to the Cure of an *Hypopyon*, or *Hypohæma*, that is, a Collection of Blood or Matter under the *Cornea*, occasioned by some Blow, or other external Violence, which must be dispersed, in order to clear the Sight. 6. This is no despicable Remedy for easing and removing intense Pains, termed by the Antients *Ophthalmoponia*, and when the Light itself is intolerable to them: For this being an internal Inflammation of the Eye, caused by an Obstruction and Distention of the Vessels near the *Retina*, the Blood discharged by scarifying with this Brush must certainly draw off what is superfluous, and greatly ease this sensible Part. And lastly, 7. The Brush will be often found very useful and necessary in Palsies, incipient Mortifications, and many other Disorders of the Eye-lids, as well as of the Eyes themselves. See PLATNERNUS *De Scarificatione Oculorum*, pag. 37, *& seq.*

When Scarification is improper.

IX. But it is not to be imagined this Instrument will be useful in all Disorders of the Eyes indiscriminately, as PLATNERNUS, WOOLHOUSE's Pupil, observes. For it will be improper, 1. in a dry *Lippitudo*, or *Xerophthalmia*, where the Eye is hot, dry, itches, and the Patient cannot look at the Light without great Pain. It will be also equally improper, 2. in Disorders of the Eyes from a *Venereal* or *Scorbutic* Cause: For, unless the Vices of the Juices be first corrected and removed, as this Operation augments their Influx upon the Parts, it may increase, rather than relieve the Disorder. Nor will it be to any Purpose to try the Brush, 3. in an old *Cataract*, *Gutta serena*, or *Hypopyon*, where the Disorder is become fixed and incorrigible by Length of Time. And, lastly, you must not expect it to cure, 4. an *Ectropium*, *Trichiasis*, *Anchylosis*, and many other Disorders of the Eye-lids, for which it is not designed.

Concerning the Brush.

X. With regard to the Eye-brush before described, it is to be observed, that a small Force will blunt it, and therefore it cannot well be used more than once: A new Brush must be provided against every Operation. 'Tis to be likewise observed, that the Beards of old Barley are not so proper as those of new, which is not altogether full ripe: Because the first, being very brittle, will be apt to shatter, and leave some of its Teeth behind in the Coats of the Eye,

which may be followed with bad Conſequences. For the ſame Reaſons alſo it ſhould not be the Product of too rich a Soil, nor have paſſed under the Action of the Flail in thraſhing the Grain.

My Opinion of the Operation.

XI. After all, I muſt confeſs, that, upon Trial, I never could experience any great Effects from this Operation, which I have frequently performed in moſt Diſorders of the Eyes. And, what is more, I have known many Patients afflicted with various Diſorders of the Eyes, which have been reported, by WOOLHOUSE, and his Pupils, to be cured by this Practice, when the only real Advantage they received from it, was the Abatement of their Pain: Which I take Notice of thus openly, leſt it might be imagined, I did not ſucceed for want of operating as I ought, in the Manner of Mr. WOOLHOUSE. I muſt indeed own, that it makes an uſeful Evacuation in *Ophthalmias*, and that I have often experienced its good Effects in many inflammatory Diſorders of the Eyes, eſpecially when aſſiſted with Phlebotomy and Bliſters: And thus I make no doubt but its Author and his Followers may have cured many Diſeaſes of the Eyes. But it may, in general, be queſtioned, whether thoſe Diſorders would not have gone off as readily by Bleeding, Purging, Bliſters, and Scarification in other Parts, as by this Practice: At leaſt the Difference will hardly countervail the extraordinary Pain it gives. We know, that Diſorders of the Eyes were very well cured before the Diſcovery of this Practice by Mr. WOOLHOUSE, and may perhaps be better removed at preſent by ſome, who are ignorant of his *Apparatus*. At leaſt this I may venture to ſay, that if, with Difficulty and much Perſuaſion, you draw in the Patient to ſubmit once to ſo rough an Operation upon ſo tender an Organ, you will not find it practicable to allure him to it a ſecond Time. Children in particular, who yet are more ſubject to Diſorders of the Eyes than Adults, are ſcarce ever prevailed on to undergo the Operation: And Female Patients are extremely averſe to it. Nor ſhall I inſiſt upon the ill Conſequences attending the Teeth of the Inſtrument's being left ſticking behind in the Coats of the Eye, and the wounding of the *Cornea*, *&c.* from the intenſe Pain obliging the Patient to move his Head and Eye, which may cauſe an Inflammation even worſe than the Original. Even the moſt prudent Oculiſts are obliged to own, that the Practice is beſet with many Inconveniencies in the very Diſorders to which it is moſt adapted: Nor can we meet with Examples enough of its good Effects to over-balance the Danger and excruciating Pain that attends it. I would therefore adviſe the young Surgeon not to be over fond of his new Eye-bruſh, nor bring it into his Practice but in Caſes of the laſt Neceſſity, when all other Means are ineffectual. It is alſo remarkable, that among the modern *French* Surgeons and Oculiſts, none take any Notice of this Practice but ST. YVES, notwithſtanding it made ſo much Noiſe at firſt. In general, the *French* Surgeons are very ſcanty and defective in treating on Diſorders of the Eyes.

CHAP.

CHAP. LIII.

Of the EPIPHORA, *or* WATERY EYE.

I. THE *Epiphora*, or watery Eye, is a Diſorder, in which the Tears, being obſtructed from paſſing through the lacrymal Ducts into the Noſe, are forced to run down over the Cheek with Deformity and Uneaſineſs to the Patient. There are ſome indeed who confound this Diſorder with the *Fiſtula lacrymalis*; but unjuſtly; becauſe in the laſt the Tears are not ſincere, but mixed with a purulent Matter flowing from an Ulcer in the lacrymal Sack. But, that the Nature of both theſe Diſorders may be the better underſtood, it will be proper to give you an Idea of the Courſe and Figure of the lacrymal Ducts, as you will find them repreſented in *Tab.* XVI.. *Fig.* 6. where *a a* denote the *Puncta lacrymalia* in the Eye-lid, *b* the *Caruncula lacrymalis*. *Fig.* 7 and 8. repreſent the lacrymal Ducts of each Eye ſeparated and here entire: *aa* denote the *Saccus lacrymalis*, as it is called; *bb* the *Puncta lacrymalia*, with their ſmall Tubes or Ducts, *c c*, leading into the lacrymal Sack. The Letters *d d* denote the *Canalis naſalis*, opening into the Noſe by the Aperture *e e*. In *Fig.* 9. you have a View of theſe Ducts annexed to the Eye, where the lacrymal Points are marked *a a*; the Caruncle *b*; the Ducts from the *Puncta lacrymalia c c*, leading into the *Saccus lacrymalis d*, thence into the *Canalis naſalis e*, and by that into the Noſe through the Aperture *f*[a]. Nature of the Diſorder.

II. This Diſorder of the Eye may proceed from many Cauſes, which impede or obſtruct the Paſſage of the Tears into the Noſe through the before-deſcribed Parts. Thus, if the *Puncta lacrymalia* are ſtopped up, it will produce an *Epiphora*, or watery Eye. But as long as the Paſſages into the Noſe are clear, that Humour, which is ſeparated by the lacrymal Gland, to moiſten and cleanſe the Eye, will be drank in by the lacrymal Points, conveyed from thence into the Sack, and from thence it will, by Degrees, paſs into the Cavity of the Noſe itſelf. The *Epiphora* may therefore proceed, (1.) From ſome hard Tumor or Tubercle, as the *Encanthis*, in the greater Canthus or Angle of the Eye, obſtructing the *Puncta lacrymalia*. (2.) From a Contraction or Concretion of the *Puncta*, after a Wound, Ulcer, or Burn of the Eye-lid: And (3.) From the ſame Cauſes, or from an Obſtruction of the *Canalis naſalis*; as may frequently happen in an Inflammation, from an inſpiſſated or gummy Matter. (4.) It may be cauſed by a Polypus, Caruncle, or Excreſcence in the Noſe, compreſſing and occluding the lacrymal Duct internally. (5.) From a *Fiſtula lacrymalis*. (6.) An *Ectropium*, or Inverſion of the Eye-lids. (7.) From an Eroſion, or Loſs of the *Caruncula lacrymalis*. And, laſtly, (8.) From a Wound in the lacrymal Duct, blocking up the ſame with an ill-formed Cicatrix. Cauſes.

III. The Diſorder itſelf may be readily diſcovered both from the Looks and Relation of the Patient: But, to find out its immediate Cauſe, requires much more Attention. When it ariſes from a Loſs of the lacrymal Caruncle, a Diſ- Diagnoſis.

[a] This Paſſage of the Tears is by many thought to be a modern Diſcovery. But the celebrated Anatomiſt MORGAGNI, in his firſt and ſixth *Adverſaria Anatomica*, has demonſtrated the Courſe to have been known and obſerved by GALEN, VEGETIUS, BERENGARIUS, FALLOPIUS, CARCANUS, STENO, *&c.* After MORGAGNI this Part has been explained at large by ANELIUS, *in Lib. De Fiſtula lacrymali*, and MEIBOMIUS, *in Epiſt. De Vaſis Palpebrarum novis*

tortion.

tortion of the Eye-lids, an Encanthis, or a Polypus, in the Noſe, the Cauſe is generally obvious enough. But when it is from a Concretion of the *Puncta*, the Cauſe can only be known by Inſpection, and conſidering whether there has been any Wound or Burn, &c. When the *Puncta* remain open, and the naſal Canal is concreted or obſtructed, the Tears have a ready Admittance into the Saccus, but not into the Noſe: Which therefore diſtend or dilate the Sack, from whence the Diſorder is ſometimes named a *Hernia lacrymalis*; and by ANELIUS it is termed a *Hydrops Sacci lacrymalis*[a]. In this Caſe, upon preſſing the Finger on the lacrymal Sack, it does not diſcharge its Contents into the Noſe as it ought, but the Tears return again through the *Puncta* into the Eye. See *Tab.* XVI. *Fig.* 10. A. Sometimes the lacrymal Sack is thus dilated, ſo as to form a very conſpicuous Tumor externally; which, by Preſſure with the Finger, will for the preſent be greatly diminiſhed, or elſe totally diſappear. If the Diſorder is at the ſame time accompanied with a *Fiſtula lacrymalis*, the aforeſaid Preſſure will diſcharge a purulent Matter along with the ſerous Humour: Whereas in the ſimple Epiphora, it will appear quite limpid and aqueous.

Prognoſis and Cure.

IV. The Prognoſis and Treatment of this Diſorder will turn out various, according to the particular Cauſe and Circumſtances. When accompanied with an Encanthis, Polypus in the Noſe, a Diſtortion of the Eye-lids, or a *Fiſtula lacrymalis*, the Epiphora cannot be cured, till you have firſt removed thoſe Symptoms which cauſe it. When it ariſes from a Concretion of the *Puncta lacrymalia*, you ſhould carefully examine whether the Ducts leading into the *Saccus*, marked *c c*, *Fig.* 7 and 8, are all along cloſed and concreted, or whether their Orifices only are occluded with a thin Film. For, if they are all the Way concreted, whether from a Cicatrix, Wound, or Burn, there will be no Poſſibility of a Cure: Whereas the thin Skin occluding their Orifices, may be eaſily perforated with a ſmall Needle, and kept open, till they are healed, with a Briſtle, or Silver Wire, dipped in *Ol. Ovor.* as at *Fig.* 11, 12, 13.

Obſtruction of the Duct.

V. If the *Puncta* appear to be pervious, and in their natural State, you may conclude the *Canalis naſalis* to be obſtructed: Which being uſually occaſioned by a glutinous Matter, may be generally removed, ſo as to cure the Diſorder, if it has been too long neglected. To diſperſe and remove the Matter, Diſcutients muſt be often applied with repeated Preſſure by the Finger, to expel the ſtagnant Humours, that they may not become acrimonious, erode the Membranes, and bring on a *Fiſtula lacrymalis*. One of the beſt Diſcutients for this Purpoſe is a Tincture of Aloës diluted in ſome Eye-water, or an Infuſion of Hyſſop, Betony[b], or ſome mineral Waters, or the Salts extracted from them mixed with an Eye-water, &c. In the mean time ſhould be ſometimes uſed a Sternutatory *ex Majoran. Lil. Conval. Mar. Majoran. Hellebor. &c.* And if theſe Means prove ineffectual, you may treat the Patient in ANELIUS's new Method of curing a *Fiſtula lacrymalis*, by paſſing a ſmall Silver Probe, *Tab.* XVI. *Fig.* 11, 12, 13, into the *Puncta*, and through the lacrymal Duct and Sack into the *Canalis naſalis*, and ſo into the Noſe. But this is an Operation that ought not to be attempted by every one, who is not an expert Operator, and well verſed in the Structure of theſe Parts: Otherwiſe you not only miſcarry in your

[a] In *Diſſert. ſur la nouvelle Decouverte de l'Hydropiſie du Conduit lacrymal.* Paris 1716.

[b] This Infuſion is highly commended by SCHOBINGERUS, for a *Fiſtula lacrymalis*, in his Treatiſe on that Subject, p. 20.

Operation,

Operation, but greatly injure the Patient[a]. The Paſſages are to be thus cleared by the ſlender Probe every Morning and Evening, for ſeveral Days, injecting afterwards ſome of the beforementioned Liquors by a ſmall Silver Syringe, *Tab.* XVI. *Fig.* 14. the ſlender Tube of which is to be inſerted into the lower *Punctum lacrymale*, as we ſhall more particularly direct in the following Chapter. And thus, by the repeated Uſe of Injections, the Diſorder will be either removed, or elſe degenerate into a *Fiſtula lacrymalis*, and muſt then be treated accordingly. Laſtly, when this Diſorder ariſes from a Loſs of Subſtance in, or an Eroſion of, the lacrymal Caruncle, it will be to no Purpoſe to uſe Remedies, becauſe the Caſe is incurable. *Vid.* HEBENSTREIT. *Diſſert. De Ocul. lacrym.* Lipſiæ 1743.

CHAP. LIV.

Of the FISTULA LACRYMALIS, *and of the Diſorders related to it.*

I. THE *Fiſtula lacrymalis* is generally underſtood to be a little Ulcer in the greater or internal Canthus of the Eye next the Noſe, which either of itſelf, or by Preſſure, diſcharges a purulent Matter. The Seat of this Ulcuſcle is in the *Sacculus lacrymalis*, or Paſſage for the Tears into the Noſe. Therefore the *Fiſtula lacrymalis* is more or leſs dangerous, in Proportion to the Size and Condition of the Ulcer, which ſometimes lies concealed only in the Sacculus, and diſcharges its Matter through the *Puncta lacrymalia:* But ſometimes again it not only erodes the Sacculus, but alſo the external Skin, and the adjacent Bone. If the Skin is not eroded through, the Fiſtula is thence denominated *imperfect*; as it is termed *perfect* after having made its Way through the Integuments[b]: But when it has alſo eat through the adjacent Bone, or rendered it carious, it is then uſually termed a *complicated Fiſtula lacrymalis*. It is remarkable, that the generality of Phyſicians and Surgeons had a wrong Notion of the Nature and Treatment of this Diſorder, till the Beginning of the preſent Century. Their Error might be owing partly (1.) To the Multiplicity of Diſeaſes to which this Part of the Eye is ſubject, and the Number of different Names which are frequently given to each of them. (2.) To the real Nature of the Diſorder, having been examined into by very few Surgeons and Anatomiſts: For moſt of them imagined the Seat of the Ulcuſcle to be either in or under the lacrymal Caruncle: Whereas the more accurate of the Moderns diſcovered, that the purulent Matter was diſcharged neither from nor behind the Caruncle, but rather out of the *Sacculus lacrymalis* through the *Puncta*[c]. Having acquired a wrong Idea of the Diſorder, they were conſequently led by that into a wrong

The *Fiſtula lacrymalis* deſcribed.

[a] Yet this Operation is far from being impracticable, as many Surgeons not well verſed in theſe Diſorders (and among the reſt GARENGEOT) would fain perſuade us. For to ſay nothing of ANELIUS, I myſelf have often and often performed it upon Numbers of Patients.

[b] This Species of the *Fiſtula* is what CELSUS (*Lib.* vii. *N.* 7.) ſeems to term *Aegilops:* But he does not ſpeak very intelligibly of it in this Place.

[c] FALLOPIUS was perhaps the firſt Anatomiſt that obſerved this, in *Tom.* II. *p.* 224. See alſo MORGAGNI, *Adverſ. Anat.* VI. 64.

Practice:

Practice: Both which the Moderns have endeavoured to correct, and not without Succeſs.

The different Names and Kinds of the Diſorder.

II. But that our Reader may be a better Judge of the falſe Opinions which have been entertained and advanced concerning this Diſorder by the principal Writers in Surgery, we ſhall endeavour briefly to relate them: And, firſt, ſome of them have by the Name of *Fiſtula lacrymalis* underſtood that Kind of Diſorder which we term *Epiphora*, or the watery Eye, and have deſcribed in the preceding Chapter. (2.) Others ſeem to uſe the Terms *Fiſtula lacrymalis*, *Anchylops*, and *Aegilops*, as ſynonymous; ſo that there is no Poſſibility of knowing their Meaning, till we are furniſhed with the proper Diſtinction and Explanation of thoſe Diſorders ſeparately. For the *Anchylops* is, by the generality of the modern Writers, uſed to ſignify a Tubercle in the greater Canthus of the Eye next the Noſe, whether it be ſeated in or near the lacrymal Sack, or whether it be with or without an Inflammation accompaning it. It ought to be here obſerved, that the *Sacculus lacrymalis*, as well as other Parts, is ſubject to encyſted Tumors, Inflammation, and Abſceſs, and very often to a Diſtenſion or Rupture, now termed a *Hernia lacrymalis*; (ſee *Tab.* XXVI. *Fig.* 10. A B. and *Fig.* 16 and 17.) in which laſt, upon preſſing the Finger on the Tumor, it ſubſides more or leſs, and the ſerous Humour diſcharges itſelf either through the *Puncta lacrymalia* at the Eye, or into the Cavity of the Noſe, or both Ways. We define an *Aegilops* to be a ſmall Tumor formed after an Inflammation or Abſceſs in the greater Canthus of the Eye, near the *Sacculus lacrymalis*; which in Time, by the Acrimony of its purulent Matter, erodes the external Skin and lacrymal Ducts, ſometimes eats away the Fat round the Globe of the Eye, and ſometimes renders the *Oſſa plana*, and other Bones near the Noſe, carious to a dangerous Degree. Sometimes the upper, lower, or both of the lacrymal Ducts, are ſo eroded, as to diſcharge large Quantities of purulent Matter through the *Puncta* in the greater *Canthus:* And then it forms the *Fiſtula lacrymalis*, whoſe Characteriſtic is a purulent Matter. But, when the diſcharged Humour is quite limpid and aqueous, the Diſorder ought then to be denominated an *Epiphora*, as we obſerved in the preceding Chapter. (See *Fig.* 18. *lit. a* and *b.*) From what we have here advanced, I think it will not be difficult for any one to diſtinguiſh the different Diſorders of this Part; which, from their Affinity, are very often confounded by Phyſicians and Surgeons.

Cauſes.

III. An *Anchylops* may proceed from many Cauſes: And, among others, an Inflammation or encyſted Tumor may produce this Diſorder, as well as occaſion a ſimple *Fiſtula lacrymalis*, or an *Aegilops*. Yet the firſt ariſes ſtill more frequently from a Relaxation and Diſtenſion of the lacrymal Sack: So that we generally meet with an *Aegilops* and *Fiſtula lacrymalis* fixed in the greater Canthus of the Eye at one and the ſame time: This ſeems to ariſe from an Obſtruction of the Paſſage of the Tears, or purulent Matter, into the Noſe: The Conſequence of which muſt be an Extenuation and Tumor of the lacrymal Sack. An *Aegilops* is generally cauſed by a previous Inflammation or Abſceſs, which frequently erode the lacrymal Ducts and the external Skin, and even produce a *Fiſtula lacrymalis* in its worſt Degree. But though there are many more Cauſes beſides Inflammation, which may produce a *Fiſtula lacrymalis*, yet there is no Cauſe ſo frequent or immediate as an Exulceration of the lacrymal Sack, or of the adjacent Membranes. But when once the lacrymal Ducts are eroded, the Matter

finds

finds an immediate Paſſage into the ſubjacent *Sacculus*, as at *Fig.* 18. A *Fiſtula lacrymalis* may alſo frequently proceed from an Obſtruction of the inferior lacrymal Duct, termed the *Canalis naſalis*, *d d*, *Fig.* 7 and 8. from whatever Cauſe that Obſtruction may ariſe. For no Obſtruction can be formed, without inducing a Stagnation of the Humour, which will therefore become acrid, diſtend the Duct, and either erode, or totally deſtroy, its Membranes. And in this Manner the Diſorder is frequently occaſioned in many Patients who have had an Inflammation in their Eyes, in the Membranes of their Noſe, or in theſe Ducts themſelves, or when thoſe Parts have been injured by the Small-Pox, as I have frequently obſerved: Though it muſt be confeſſed, that the Diſorder ſometimes ariſes ſpontaneouſly, without the Aſſiſtance of any of the beforementioned Cauſes.

IV. There are various Species of theſe *Fiſtulæ*. The firſt Diſtinction of them is, (1.) Into *perfect* and *imperfect*: The former of which is, when the purulent Matter flows out through an Eroſion of the Skin in the Canthus; and the latter, when the Matter is diſcharged through the *Puncta lacrymalia*, the Skin remaining entire: Which laſt Kind is generally accompanied with a Tumor of the lacrymal Sack. You may have an Idea of the perfect Kind, from conſulting *Tab.* XVI. *Fig.* 19. *a b*. Some of theſe *Fiſtulæ* are again diſtinguiſhed into (2.) *Simple* and *Compound*; the laſt of which is, when a Calloſity, Caries, or the like, attend. Some again are, (3.) *Mild* and *recent*; others *old* and *malignant*. (4.) Some *intermitting* and *periodical*; others *continual*. Still more Diſtinctions of the ſeveral Species of this Diſorder may be ſeen in *p.* 8. of our profeſſed Diſſertation on the Subject in 4^to^ 1716, at *Altorf*. We have ſtill another Diſtinction of theſe *Fiſtulæ* into *true* and *falſe*, made by M. GARENGEOT: By the *true*, he underſtands an Ulceration of the lacrymal Ducts; and by the *falſe*, he intends an Ulceration in the adjacent Parts only, which we term an *Aegilops*. Some[a] will have a Calloſity eſſentially neceſſary to the Formation of a *Fiſtulæ lacrymalis*; becauſe a Callus is conſtantly found in moſt other *Fiſtulæ*: But this is not the common and received Notion of a *Fiſtula lacrymalis*, as we are taught by the Authorities of CELSUS, FALLOPIUS, CARDAN, WOOLHOUSE, and MORGAGNI, *adverſ. Anat.* VI. *p.* 82. and from daily Experience. M. ST. YVES[b], the late famous Oculiſt at *Paris*, aſſerts, that he ſeldom found a Callus in theſe *Fiſtulæ*: And I myſelf have obſerved a great many, and thoſe inveterate lacrymal *Fiſtulæ*, which have yet had no Calloſity. There are ſome Surgeons again, who imagine that there never can ariſe a *Fiſtula lacrymalis*, without an Obſtruction of the *Canalis naſalis* at the ſame time, becauſe ſuch an Obſtruction muſt be the Occaſion of the *Fiſtula*. But even this Opinion is without Foundation, as hath been long ago evinced by the Authorities of the beſt Writers, and as I have been frequently aſſured by Experience: For I have often obſerved, and am now acquainted with ſome of theſe *Fiſtulæ*, in which the purulent Matter has a free Exit from the lacrymal Sack through the *Puncta lacrymalia*, if you preſs it with the Finger every Day; and at the ſame time the *Canalis naſalis* appears to be open, becauſe the purulent Matter is alſo diſcharged through it into the Noſe[c].

Kinds of the Fiſtula lacrymalis.

[a] As SIGNOROTTUS and PLATNERUS, in *Diſſ. de Fiſt. lacrymali*, Sect. 1, 2, 3.

[b] See his *Traité des Maladies des Yeux*, pag. 59. and SCHOBINGERI *Diſſ. de Fiſtul. lacrym.* p. 3.

[c] Some will have it, that the purulent Matter flows only through the upper, and others only through the lower *Punctum lacrymale*; but it has generally a Paſſage through both, though often more is diſcharged through one than the other.

Signs of the Fistula lacrymalis.

V. Having in general described and explained the several Kinds of these *Fistulæ*, and the Disorders related to them, we shall now proceed to the Signs by which they are discovered. And first, you may be pretty well assured, that the Patient has a lacrymal *Fistula*, if he complains of the Tears being more copious than usual, and running over his Cheek, and that a Quantity of purulent Matter is found collected in the Eye, in a Morning chiefly; and at the same time you observe no Appearance of Inflammation: But if you press the lacrymal Sack with your Finger, it discharges a Quantity of purulent Matter by the *Puncta lacrymalia*. This appears to me the most certain Sign of a *Fistula lacrymalis*: And with me FALLOPIUS, WOOLHOUSE, and ANELIUS concur. You may judge whether there be any Caries from the ill Smell, and from the livid or blackish Colour of the Part, with the Discharge of purulent Matter: And especially, if the Bone appears bare or eroded to the Eye or Probe, in open *Fistulæ*. The Colour of the Matter discharged is so far from giving a sure Indication, whether or no the Bone is carious, that I have often found it of a good Colour, when at the same time the Bone appeared rough and eroded to the Probe: But you may be generally assured, there is a Caries of the Bone, if the *Fistula* has been of very long standing, and discharges a large Quantity of Matter. But the Seat of the Caries is not always the same, being sometimes in the *Os lacrymale*, sometimes in the *Os planum*, and in the *Os maxillare superior*. You may discover whether the *Canalis nasalis* be obstructed, from little or none of the purulent Matter, or injected Liquor, being able to make its Way into the Nose, but all returning through one of the *Puncta lacrymalia*[a]. A Callus in these *Fistulæ* may be discovered by the unusual Hardness or Resistance which the Parts give to the Finger; but this is not a frequent Symptom in lacrymal *Fistulæ*, as hath been often observed by ST. YVES, M. GARENGEOT, and myself. If these Parts are infested with an encysted Tumor, they appear preternaturally enlarged, and harder than usual, nor does the Tumor subside by pressing it with the Finger; and there appears no Sign of Inflammation. But if the Tumor subsides by Pressure with the Finger, you may conclude there is a *Hernia lacrymalis*, or Dilatation of the lacrymal Sack. Lastly, an *Aegilops* is discovered by the Appearance of an Exulceration in the Greater Canthus of the Eye next the Nose, without affecting the lacrymal Ducts.

Prognosis.

VI. The several Disorders before enumerated usually terminate differently, according to particular Circumstances. But as the Eye itself, and the spongy Bones of its Orbit, are so nearly situated, it is hardly possible the Patient should escape a Caries in the last, with many grievous Symptoms in that Organ itself. An *Anchylops* or *Aegilops* may very easily degenerate into a Fistula; and a slight Fistula may become obstinate, malignant, and even cancerous; which having destroyed the Bones, there are then but little Hopes of obtaining a Cure. These Disorders are in general more or less malignant, according as the Patient is of a good or bad Habit of Body, as the Matter of the Fistula is more or less acri-

[a] I observed an uncommon Species of the *Fistula lacrymalis* here in a Student, *Anno* 1726; in which, though the Disorder had been of eight Years standing, yet no Matter could be discharged by pressing with the Finger. The Tears constantly issued down upon his Cheeks, and after Sleep the Eye was found replete with a purulent Matter: But when a Quantity of Liquor was injected at either *Punctum*, it ran out with some purulent Matter through the other. There was no Tumor of the lacrymal Sack; but, upon incising the Integuments, the lacrymal Bone was found carious.

monious,

monious, and as to the Patient is more or less regular in his Diet and Course of Life. If the Patient is in other Respects well, the Disorder recent, and without a Caries, Callus, or other bad Symptoms, there is no great Danger: But the Disorder may be cured, by the Method of ANELIUS, in a few Day's time. The perfect or compleat Fistula which has eroded through the Skin, is generally attended with a Caries; and is therefore hardly, if at all, curable, before the carious Bones are removed. Also a Callus must be first removed before you can cure those *Fistulæ* in which it is found. But if both Callosity and Caries are absent, a Cure may be obtained with much more Ease and Expedition. Again, in general, the older or more inveterate the Fistula, the more difficult it is to cure; because in them the Bones are commonly infested with a Caries: And if that is not perfectly removed, though you should, in Appearance, cure the Disorder, it will quickly return again. But what is more than a little surprising, there are some Surgeons who write, that several of these *Fistulæ* which have been accompanied both with a Callus and a Caries, have been cured barely by leaving the Disorder to Nature[a]. Unless the *Canalis nasalis* be rendered pervious, and kept open, the Cure cannot be compleated: For though you remove the Callus and Caries by the Knife or Cautery, the Patient will be afterwards troubled with a watery Eye, in which the Tears run down over the Cheeks. The compressing Instruments formerly used to relieve this Complaint, do little more than molest the Patient, or frequently turn a mild into a malignant Fistula. But the Practice of the modern Surgeons is greatly to be preferred before that of the Antients in this Disorder: For the First being reformed by the Authority and Example of ANELIUS, about the Year 1712, have ever since continued to cure recent *Fistulæ* of this Species after his Manner, without either the Use of the Scalpel, Terebra, or Cautery, provided there is no Callus or Caries in it, notwithstanding what others may say to the contrary. Whereas formerly they hardly ever cured a *Fistula lacrymalis* of any Kind, without the Use of one of those severe Remedies[b].

VII. If the Patient is troubled with an *Anchylops*, or Tumor or Inflammation in the greater Angle of the Eye next the Nose, the Surgeon must, in that Case, use his Endeavours first to disperse it, to prevent the Tumor from degenerating into an Abscess or Fistula. This Intention may be best answered towards the beginning of the Disorder, by moistening the Part with a little *Sp. Vitriol.* dipping a small Brush, or the End of the Finger therein, several Times in a Day, as in treating upon Tumors we directed for the Furuncle: But in this Practice you must be very careful to avoid injuring the Eye itself. Upon which Account it may, in some Cases, be safer to use a Liniment of *Mel. Rosar.* acidulated with *Sp. Vitriol.* covering the Part afterwards with a Diachylon Plaster. In most Cases, a Cure may be almost as readily obtained by frequent fomenting with Compresses dipped in warm *Sp. Vini Camph.* and a Cataplasm *ex Pomis coctis, vel assatis Camphoroque mist.* to be continued till the Tumor subsides, and the Inflammation is dispersed. If the Tumor should appear to be of the encysted Kind, you may treat it as we have directed in *Chap.* XXVIII. *Sect.* I. *N.* VI, and VII. foregoing: By which Method I happily extirpated a large encysted Tumor by the Scalpel, which was very deeply situated in the

Treatment of the Anchylops.

[a] This does but very seldom happen. See more in MAITRE-JEAN, *in Lib. De Morbis Oculorum, in Cap. de Fistula lacrymali.*

[b] See my Dissertation on this Subject.

Orbit of the Eye of a certain Maid. Laſtly, when the Tumor ariſes from a Diſtention of the lacrymal Sack, you muſt treat the Diſorder by the Methods we ſhall preſently direct at *N.* X. following.

Treatment of the Ægilops.

VIII. If the laſt mentioned Tumor or Inflammation rather tends to Suppuration than to be diſperſed by the preceding Treatment, it will then be proper to forward its Maturation or Converſion into Matter as much as poſſible, leſt an obſtinate Fiſtula, or worſe Conſequences, ſhould be the Effects of too long Delay. The Suppuration of it may be conveniently promoted by a Diachylon Plaſter with the Gums, or an emollient Cataplaſm frequently applied warm. As ſoon as you can diſcover that the Matter is ſuppurated, you are to open the moſt depending Part of the Tumor, either with a Lancet or Scalpel, to diſcharge and preſs out the Matter, that it may not eat through its including Cyſt, or the adjacent thin Bones. That being thus diſcharged, the Abſceſs or Ulcer muſt be next deterged by dreſſing with digeſtive Ointments, or *Mel. Roſarum cum Myrrha, vel Ung. Ægyptiac. ſeu Præcipitat. Rub. Portiuncula permiſt.* after which it may be healed with vulnerary Balſams, in the Manner we directed for Abſceſſes in general. If the Abſceſs in this Diſorder ſhould break of its own accord, as I have frequently known it to do, and its Aperture or Orifice appears too narrow to give a free Diſcharge to the Matter, it may be afterwards dilated with a Tent, prepared Sponge, Gentian Root, or rather by the Scalpel, and then treat it as before. If the Bone appears foul, it will be neceſſary to apply ſome ſcraped Lint, with a few Drops of *Sp. Sulph. aut Vitriol.* on a little *Pulv. Euphorb.* laying over it a Compreſs dipped in *Aq. Calcis*; by which Means having removed the Caries, the Wound will be diſpoſed to heal. Sometimes it will be found neceſſary to exfoliate or ſcrape the foul Bone with the Raſp, repreſented in *Tab.* VII. *Fig.* 3, 4, 5, or *Tab.* XVIII. *Fig.* 9. Some Surgeons think it a more ready Method of Cure, to cauteriſe the Bone with red-hot Irons, adapted to a Tube or Caſe, as in *Tab.* XVI. *Fig.* 21 and 22. compleating the reſt of the Cure with Balſams or vulnerary Medicines, in the Manner we ſhall explain more at large in treating of this Diſorder at *N.* XII. following.

Treatment of ſlight Fiſtulæ.

IX. The Treatment of the true Species of lacrymal *Fiſtulæ*, in which there is an Ulceration of the lacrymal Paſſages, is various, according to the different Nature, Degree, and Circumſtances of the Diſorder. For when the Fiſtula is recent, the Patient of a good Habit, the Skin entire, and the Ducts not ulcerated or obſtructed, but diſcharging freely a mucous, and not a purulent Matter into the Noſe; you ought not, in theſe Circumſtances, to have immediate Recourſe to the Knife, Terebra, or Cautery, but firſt endeavour to cure the Fiſtula by the mildeſt Methods of Treatment, before you try the ſeverer Operations of Surgery. In this Caſe, you ſhould frequently expreſs the Matter included in the lacrymal Sack by your Fingers; leſt it become ſo acrid, as to erode the adjacent Parts by its too long Stay: And, in the Intervals, you ſhould ſtrive to cleanſe or deterge the Parts by the repeated Uſe of the mundifying Remedies, which we adviſed for the watery Eye in *Chap.* LIII. *N.* V. At the ſame time, too, you muſt call in the Aid of Phlebotomy, Purges, Scarification, Bliſters, Diet, and Regimen, according to the Patient's particular Habit and Circumſtances.

Cure by Compreſſion.

X. M. DIONIS tells us, in his *Surgery*, that he has cured many of theſe recent *Fiſtulæ*, particularly in Infants, barely by Compreſſion in a proper Manner: And GARENGEOT alſo affirms the ſame to have been done formerly at *Paris* by that

that eminent Surgeon M. ARNEAU. By the first of these the Compression was made in the following Manner: 1. First of all he imposed a Piece of *Emplast. de Minio* upon the Tubercle or Fistula of the lacrymal Sack: Then, 2. he applied a small triangular Compress of about the Thickness of one's Finger, or, instead of the one thick Compress, several thinner ones upon each other, in order to fill up exactly the Cavity in the Angle of the Eye next the Nose. In the next Place, 3. he adapted another Compress over the former, dipping both of them first in some *Aq. Calc.* or *Sp. Vini*. Lastly, 4. he firmly secured and pressed down the Compresses upon the Tumor by a strict Deligation with a circular Bandage; that, by this Means, none of the vitiated Humours might be collected or retained, and that the relaxed *Sacculus* might, by Degrees, recover its former Tone and Dimensions. But, according to M. DIONIS, this Treatment must be continued for several entire Months to cure the Patient. It is to be observed, that some use a peculiar Instrument for compressing the Parts disordered, instead of Compresses and Bandage: Of which Instrument there are several Kinds proposed by FABRIC. AB AQUAPENDENTE, SCULTETUS, PALFYN, and myself, in *Tab.* XVI. *Fig.* 20. taken from PLATNERUS. But, after all, this Method by Compressure will be to no Purpose when the lacrymal Ducts are concreted or obstructed: For the Advantage of this Practice can only take Place when there is an Abscess near the lacrymal Sack, as in *Fig.* 18. or at least when the lacrymal Ducts are found pervious.

XI. When the Disorder is become so malignant or inveterate as not to be relieved by the preceding Method of Compression, the general Practice of Surgeons in that Case was formerly, and now is, to lay open the Tubercle, or distended lacrymal Sack almost in the Middle, betwixt the internal Canthus and the Nose: And this either by Caustic, or rather by Incision with a Scalpel or a Lancet; but with great Circumspection, to avoid wounding the lacrymal Ducts and *Puncta*, which lead to the Sack, or the Ligament which fastens one Eye-lid to the other, which would greatly deform the Eye. 'Tis generally advised to make this Incision obliquely: As, for Example, from *d* towards *e* or *c*. *Fig.* 9. *Tab.* XVI. or in *Fig.* 10. from B towards A; for which some prefer the straight, and others the crooked Scalpel: But either of them will do, in my Opinion; for I have successfully performed the Operation with both. Your Incision must be continued downward, till you have penetrated into the Cavity of the lacrymal Sack, enlarging it afterwards both upward and downward into the aforesaid Direction from the Top of the Sack down to the *Canalis osseus*. The Wound is next to be dilated by filling it with Lint (though PLATNERUS and GARENGEOT recommend a particular Instrument for this Use) and lastly the Dressings are to be secured with Compress and Bandage. There are others again who rather approve of making this Incision in a semicircular Form like an Arch, whose Convexity must be towards the Nose, and Concavity towards the Eye; beginning the Incision at the lower Part of the *Apophysis nasalis* of the *Os frontis*, where that Bone meets the *Os maxillare* and *lacrymale*, and continuing your Incision from thence, in the Form of an Arch, to the Meeting of the internal *Apophysis* of the *Os jugali*, as we have represented by the dotted Line *c b Fig.* 19. *Tab.* XVI. When your Incision is sufficiently enlarged by the Knife, you must dilate it further with Lint, as before: By which Means you have an Opportunity the next Day of observing, whether the Bones be carious, and in what

Cure by Incision.

Part

Part or Manner it will be beſt to perforate them. If the Wound ſhould bleed much, you may apply a Pledgit of Lint dipt in *Sp. Vini rectificatiſſ.* to be retained on the Part with a Compreſs, and a little ſtricter Bandage. In the ſubſequent Dreſſings you muſt uſe *Eſſent. Succin. Ol. later.* and other detergent Applications, as we before directed for the *Aegilops*, at *N.* VIII. When the Parts are well cleanſed, you may finiſh the Cure with ſome vulnerary Balſam and deſiccative Plaſter, retained with a thick triangular Compreſs, as we directed at *N.* X. and thus the Wound gradually heals. Others again apply the compreſſing Inſtrument beforementioned upon the Wound over the Compreſs and Plaſter; but not very often with the deſired Succeſs, becauſe the *Canalis naſalis* is generally hereby obſtructed.

The antient Treatment of a callous Fiſtula with Caries.

XII. In a callous *Fiſtula lacrymalis* the Method of Treatment uſed by the antient Surgeons was, to open the Ulcer firſt, and then to dreſs it with *Trochiſc. de Minio, Præcipit. rub. Ung. Ægyptiac. Lap. infernal. &c.* with which they removed the Calloſity, and then finiſhed the Cure in the Manner we before directed. But if a Caries alſo accompanied it, they applied *Pulv. ex Euphorbio*, or *Sp. Sulphur. Vitriol. &c.* with ſcraped Lint. If theſe did not anſwer, they then raſped or ſcraped the vitiated Bone, as we directed at *N.* IX. or elſe applied the actual Cautery ſeveral Times, according as the Caſe required. The cauterizing Inſtruments uſed in this Diſorder, were of various Figures, as the Surgeon beſt fancied: As you may ſee by thoſe figured in AQUAPENDENS, SCULTETUS, SOLINGEN, PALFYN, DIONIS, GARENGEOT, PLATNER, *&c.* Some were uſed naked without any Tube, as thoſe we have repreſented in our *Tab.* III. *Fig.* 14 and 16. Others again were furniſhed with a Tube, which was firſt placed in the Wound cloſe to the Bone, and then the Cautery was conveyed through it, to avoid burning the Skin and Lips of the Wound: See *Tab.* XVI. *Fig.* 21, 22. The Eſchars formed by the Cautery were afterwards ſeparated by ſome digeſtive Ointment, and the Wound then healed with vulnerary Balſams, as we directed before. But in performing this Operation you ſhould firſt not only bind up the Patient's ſound Eye, that he may not be terrified at the Sight of the Cautery, but you ſhould alſo ſecure the diſordered Eye by an Inſtrument in the ſhape of a Spoon, *Tab.* XVI. *Fig.* 23. that it may not be touched by the Cautery. It will be alſo previouſly neceſſary to dry the Bone well with Lint before you apply the Cautery, which will otherwiſe be too ſoon extinguiſhed. But, after all, this Treatment, in order to cleanſe the Fiſtula by the Cautery, will be to little or no Purpoſe, ſo long as the *Canalis naſalis* remains obſtructed. Nor can the Tears be diſcharged into the Noſe, unleſs anew Paſſage be made for them by perforating the Bones with the Cautery: Otherwiſe the Patient will be continually moleſted with a watery Eye after the Fiſtula is cured: So that this Method of Cure will, in my Opinion, ſucceed beſt when the *Canalis naſalis* remains pervious and entire, or when there is a Suppuration without-ſide the lacrymal Sack. Therefore it will be highly neceſſary to diſtinguiſh thoſe *Fiſtulæ*, in which the *Canalis naſalis* is occluded, or ſhut up, from thoſe in which it is not.

Cure by perforating the Os lacrymale.

XIII. To remove the laſt mentioned Symptom, the watery Eye, in the Cure of theſe *Fiſtulæ*, ſome Surgeons have propoſed the following Method: *viz.* After opening the lacrymal Sack, as we directed before at *N.* XI. the next Day they perforated the *Os Unguis* with a ſharp-pointed Inſtrument for the Purpoſe,

(*Tab.*

(*Tab.* XVI. *Fig.* 24. or *Tab.* VII. *Fig.* 7. or *Tab.* XXIV. *Fig.* 2.) which is carefully paſſed obliquely through the upper and lower Part of the *Os ſpongioſum* into the Cavity of the Noſe: After which they introduce and leave a ſmall Tent in the Wound, which is frequently cleared and opened with a Probe; till being healed, it forms an artificial lacrymal Duct. Some remove the Caries, and make an artificial lacrymal Duct, at the ſame time, by the forementioned Inſtruments, or by a Director, without any actual Cautery: Which laſt is, however, uſed by ſome like that at *Fig.* 21. with the Tube *Fig.* 22. [a] with which the Bones are perforated, and a Paſſage made for the Tears into the Noſe as before. Though theſe Methods of Cure are very troubleſome and painful to the Patient, yet they are at preſent uſed as the beſt we are acquainted with. And St. YVES, the famous Oculiſt of *Paris*, treated his Patients in the ſame Method, as he informs us in his Treatiſe on *Diſorders of the Eyes.*

ANELIUS's new Method of curing lacrymal Fiſtulæ.

XIV. But, in Conſideration of the great Difficulty there is to perſuade timorous Patients, eſpecially thoſe of higher Rank, to undergo the Severity and Fatigue of the forementioned Operations of Inciſion, boring, cauterizing, *&c.* ANELIUS, in the Year 1712, endeavoured to contrive a more ſafe and eaſy Method of curing theſe *Fiſtulæ*, in favour of the Duke of SAVOY, who was then troubled with the Diſorder. Which Method ſucceeded ſo well, as to cure not only recent, but even inveterate *Fiſtulæ*, if not accompanied with Callus or Caries, and that even without the Severity of the Knife, Cautery, or Compreſſion, in the following Manner.

The Uſe of ANELIUS's Probe.

XV. He firſt provided himſelf with a ſlender Probe, in the Form of an Arch, made of ſmall Silver-wire, as in *Tab.* XVI. *Fig.* 11, 12, 13. then placing the Patient in a convenient Poſture againſt the Light, he opens the upper Eye-lid with the Fingers of one Hand, while, with thoſe of the other, he introduces the crooked Probe through the upper *Punctum lacrymale* into the Sack; which may be done with more or leſs Difficulty, according as the Surgeon has before conſidered the Figure, or Poſition, and anatomical Structure of the Parts. After having introduced the Probe into the Sack, he gently agitates and preſſes it downwards, and towards the Noſe, with a certain Slight, into the obſtructed *Canalis naſalis*, which, by this Means, opened. Theſe Ducts are much more eaſily opened by this Artifice, when they are only obſtructed by Matter, or ſome glutinous Humour, than when they are totally cloſed and concreted, as is frequently obſerved in theſe *Fiſtulæ* which are inveterate: For the laſt ſometimes require the Probe to be preſſed into them ſo forcibly, as to excite ſome Pain, and often ſet the Noſe a bleeding a little [b]. But to prevent the newly-opened Duct from cloſing again, M. ANELE thinks it neceſſary to inject ſome Liquor every Night and Morning, or oftener; and then to repeat the Introduction of the Probe as often as it may be found neceſſary, till no more Matter iſſues from the *Puncta lacrymalia:* Which denotes the Ulcer to be cleanſed, and the Ducts to have recovered their natural State.

[a] See SOLINGENIUS, PALFYNUS, and GARENGEOT.

[b] M. GARENGEOT appears to be ignorant of the Uſe of theſe Probes, when he thinks they cannot open the Ducts, but only ſerve to ſearch out the lacrymal Sack. See *N.* XXV. following. STAHLIUS was the firſt, who paſſed the Briſtle through the *Puncta lacrymalia* into the lacrymal Sack; but not with the View of opening the naſal Duct.

XVI. To

Use of M. ANELE's Syringe.

XVI. To inject these Parts, I must recommend the Syringe, contrived by ANELIUS, and represented in *Tab.* XVI. *Fig.* 14. or else some other like it. The Tube A, in the anterior Part of this Instrument, is about the Thickness of a Hog's Bristle, and is to be inserted into the *Punctum lacrymale* of the lower Eye-lid, as being less moveable: In which Manner you force the healing Injection several Times into and through the lacrymal Sack, in order to wash out the Sordes, and render the Ducts pervious[a]. To perform this Operation the more easily, your Patient ought to be placed against the Light, with his Head either erect, or a little inclined backward: And, if the Disorder be in the Right Eye, the Surgeon should stand on the Right Side of the Patient, and having filled the Syringe with a suitable Injection, he then places his left Ring-finger under the *Punctum lacrymale* of the lower Eye-lid, near the lacrymal Sack, and thereby draws down the Eye-lid, to bring the *Punctum lacrymale* into View; and thus he more easily inserts the Tube of the Syringe, and, at the same time, his Finger serves as a Fulcrum, or Support, to the others which move the Syringe. Having, in this Manner, secured the Eye-lid, the Surgeon next takes the Syringe by its Hinder-part C, betwixt the Fore and Middle-finger of his Right Hand, and carefully inserts the Tube A, in the lower End of the Syringe D, into the lower *Punctum lacrymale:* After which he presses the Handle of the Sucker B into the Syringe by the Thumb of the same Hand, so as to force the Liquor through the lacrymal Duct, Sack, and *Canalis nasalis* into the Nose; from whence it will run into the Fauces, and some Part of it will escape through the upper *Punctum lacrymale.* But to say Truth, the whole of this Method is much better and easier demonstrated by Practice, than expressed by Words. If the Disorder be in the Left Eye, the Surgeon must then stand on the Right Side of the Patient, and manage the rest of his Operation as before. If the Surgeon pleases, he may, for Variety, insert his Syringe, and inject by the upper *Punctum lacrymale*, after having turned it upward and downward by his Finger. But to inject by either of them as he ought, he should be provided with good sharp Eyes, and a dextrous Hand: Though he will find it the most easy of the two, to inject by the lower *Punctum lacrymale.*

What more must be done.

XVII. These two Operations of Probing and Injecting must be continued, or repeated every Day, till you find, 1. that the Injection will pass freely into the Nose without the Assistance of the Probe; and, 2. that there is no purulent Matter discharged either spontaneously, or by Pressure from the lacrymal Sack into the greater Canthus of the Eye. And then you may conclude, from these two Circumstances, that the Cure is completed: Which however is not always performed within the same time, but sooner or later according to the Nature and Degree of the Disorder. When mild, it is sometimes cured within four, eight, fourteen, or twenty Days; and sometimes longer. But there is hardly any lacrymal Fistula so bad, but it may, by this Means, be cured in Time, provided it be free from Callus and Caries. I have myself often cured these *Fistulæ* in so short a Space as three Days, by this Practice: And have even found, by Experience, that this Method of ANELIUS will not prove altogether unsuccessful, even in those *Fistulæ* which have a slight Caries. By this Method I cured a Girl of ten Years old, in the Year 1727, of an inveterate *Fistula lacrymalis*, with a

[a] M. GARENCEOT (in Cap. *De Fist. Lacrym.*) advises the Tube of the Syringe to be agitated, till you have introduced it into the lacrymal Sack; but this is not necessary; it is sufficient you insert it into the *Punctum lacrymale*, or the Beginning of the Duct.

slight

ſlighter Caries, which I injected every Day for ſix Months: The Patient is at this Day well, and married.

XVIII. In the perfect or complete Species of the *Fiſtula lacrymalis*, in which the external Skin is eroded or ulcerated, you may much more eaſily open the Paſſage of the occluded naſal Canal, than in the other Kind. For in this Diſorder you may readily paſs the forementioned Probe of ANELIUS, immediately through the *Canalis naſalis* right down into the Noſe, and that even with its largeſt End foremoſt, marked *b*, in *Fig.* 12. I have even ſeveral Times opened the naſal Canal readily in this Species of the Diſorder, by the Probe marked K, in *Tab.* I. For deterging the Ulcer, and compleating the Cure, you muſt follow the Methods we have before propoſed: Only inſtead of a Tent of Lint, you ſhould uſe one of Lead or Wax, and touch the *Canalis naſalis* every other Day cautiouſly with a conical Bit of *Lapis infernalis*; and, after healing up the external Lips of the Wound, uſe the Injections adapted to keep open the naſal Canal for a conſiderable Time. M. PETIT has ſometimes ſucceſsfully uſed a thick waxed Thread, to keep open the naſal Canal, inſtead of a Tent, as we are informed by M. GARENGEOT, in his Chapter on this Diſorder. But when you find the *Os Unguis* foul or vitiated, you muſt enlarge the Opening of your Ulcer, and remove the Caries, or perforate the Bone, as we before propoſed. Treatment of complete or open Fiſtulæ.

XIX. In thoſe lacrymal *Fiſtulæ*, which have no Obſtruction of the naſal Canals, inſtead of probing, you muſt more frequently waſh out the offending Sordes by Injection. The beſt Injections in this Caſe are of the Decoctions of vulnerary Herbs, all mineral or medicated Waters; or *Aqua Calcis*. When you perceive the lacrymal Sack too much relaxed or diſtended, you muſt endeavour to recover its Tone by topical Remedies, as *Hungary* Water, *&c.* And the Lips of the Wound muſt be touched frequently with the *Lapis infernalis*; by which the relaxed Skin will be greatly ſtrengthened: You ſhould alſo apply the compreſſing Inſtrument repreſented in *Tab.* XVI. *Fig.* 20. or ſome other figured for the ſame Purpoſe by AQUAPENDENS, SCULTETUS, or PALFYN. Fiſtulæ without Obſtruction of the naſal Canal.

XX. But it muſt not be imagined, that the Method of probing and injecting, contrived by ANELIUS, will cure all lacrymal *Fiſtulæ* whatever. For in ſuch as are inveterate, and attended with an obdurate Callus, or a ſpreading Caries, this Practice will be to no Purpoſe. Nor are we as yet furniſhed with Remedies ſufficient for the Cure of ſuch *Fiſtulæ*; though I can acquaint you, that *Archiater* BRUNNERUS aſſures me in a Letter, that he cured a lacrymal Fiſtula of the very worſt Kind by a mercurial Injection. It very often happens too, that the Flux of purulent Matter in this Diſorder cannot be leſſened, nor the naſal Canal kept open by Injection, ſo as to make a Paſſage into the Noſe, even though it may ſeem pervious to the Probe: Of which I have known various Inſtances, without being able to account for the Cauſe. In theſe Caſes, therefore, if the Patient preſſes for a Cure, there remains but one Method of relieving him, and that is, by removing the Callus and Caries, and by making a new Paſſage, or an artificial naſal Canal into the Noſe. See N° XII and XIII. preceding. Sometimes the Caries penetrates ſo far into the *Oſſa ſpongioſa* of the Noſe, that it is impoſſible for you to extirpate the ſame either by Remedies or the Cautery: Though I muſt confeſs this to be a Caſe that never occurred in my own Practice. But even in the very worſt Caſes, the Diſorder may by palliated, Callous and carious Fiſtulæ.

liated, and the Patient much relieved, by making a Paſſage for the purulent Matter, to run into the Noſe, which before diſcharged itſelf with great Uneaſineſs at the Corner of his Eye: And in theſe Caſes too you will find Injections of the greateſt Service.

Other new Methods of Cure.

XXI. We before obſerved, that, in imperfect *Fiſtulæ*, where the Skin is not eroded, you ought firſt to make an Inciſion through the Integuments before you perforate the *Os unguis*. But, to render the Operation leſs formidable and ſevere, a certain Surgeon of *Hamburg* thought it beſt to perforate the Skin, Sacculus, and Bone at once, with an Inſtrument contrived for that Purpoſe, repreſented in *Tab.* XVI. *Fig.* 24. keeping open the new-formed lacrymal Ducts by a Tent, till the Wound was healed externally. Laſtly, as ſome of the Moderns have found, that the new naſal Canal formed by perforating the *Os unguis*, does frequently fill up, or grow together, they have endeavoured to prevent it (by WOOLHOUSE's Direction) by inſerting a ſmall Tube of Lead, Silver, or Gold, *Tab.* XVI. *Fig.* 25. which is left there ever after, and the external Wound healed up over it, that the Paſſage may not afterwards cloſe up. In this Practice I have ſeveral Times ſucceeded myſelf: But then I uſed a Tube a little larger than the common, as at *Fig.* 26. that the Tears might have a free Paſſage; healing up the Wound afterwards over the Tube.

LEMORIERE's Method.

XXII. We have ſtill another new Method of curing lacrymal *Fiſtulæ*, propoſed to the Royal Academy at *Paris*, by M. LEMORIERE [a]. He firſt opens the lacrymal Sack in the uſual Manner by a Scalpel, and then inſerts a particular Kind of ſharp-pointed and crooked Forceps, *Tab.* XVI. *Fig.* 29. A, with the Beak of which he breaks through the *Os lacrymale* into the Cavity of the Noſe. In the next Place, he dilates the Perforation with the Forceps, *Fig.* 30. with which he further lacerates and breaks the *Os lacrymale*, and Membrane of the Noſe, to enlarge the Ducts, ſo that it may not eaſily cloſe up again, which it is otherwiſe very apt to do. After removing the Forceps, he dreſſes the Wound for the firſt Days with Lint, and ſome digeſtive Ointment: But, on the third or fourth Day, he introduces a Bit of Wax-Candle into the new-formed Duct inſtead of a Tent, which ſhould be about the Thickneſs of a Straw, or one Line at leaſt in Diameter, made a little crooked, and armed with a ſmall Head, as at *Fig.* 31. A, B. This he continues in the Duct for the Space of thirty or forty Days, till the Parts are well formed; after which he removes the Candle, and heals the Wound: By which Method, he aſſerts, the Duct may be certainly kept open without any Danger of Concretions.

M. ST. YVES's Method.

XXIII. We have alſo another Method of curing theſe *Fiſtulæ*, given us by the famous Oculiſt ST. YVES of *Paris*, and deſcribed by SCHOBINGERUS, in a Treatiſe *De Fiſtula lacrymali Baſil. Ann.* 1730. as follows: Firſt, he gently elevates and ſtretches the Skin at the greater Canthus of the Eye, as in opening a Vein, and then makes an oblique Inciſion with a Lancet, through the Integuments, and lacrymal Sack from the Eye-lids towards the Tendon of their orbicular Muſcles [b]: He next dilates the Wound by inſerting a Tent of prepared Sponge, and defends it with a Piece of Plaſter. The next Day, after removing the Dreſſings,

[a] In *Memoir. Acad. Reg.* An. 1729. pag. 590. Edit. *Amſtel.*

[b] I ſuppoſe the Inciſions muſt be made from below upward: But it does not appear from this Deſcription.

he

he examines the State of the Wound and *Os unguis* with a Probe, and by Injection; and is particularly careful in his Enquiry, whether the Bone be carious. This done, he supports the Patient's Head in a reclined Posture with one Hand, while, with the other, he cautiously and obliquely perforates the *Os unguis* towards the Nose with a triangular Probe, by the *French* called *Troicar:* In doing of which, great Care must be taken not to mistake the *Os planum* for the *Os unguis*, lest, by perforating the first, you should run into the *Antrum Highmorianum*, or else upon the *Apophysis nasalis* of the *Os maxillare*. Add to this, that when the Apex of the Trocar has entered obliquely through the *Os unguis*, you must then direct it betwixt the two *Laminæ* of the *Os spongiosum* in the Middle of the Nose, that you may avoid injuring those *Laminæ*, or any of the adjacent Parts. The Perforation thus made, the Surgeon now directs the Patient to breathe deep, and blow out the Air forcibly through his Nose; that by the Exit of the Air and Blood through the Wound, he may judge whether the Perforation be rightly made. To dilate and keep the Passage open, he at first inserts a Bit of Wood like a Wedge, and covers it with a Bit of Plaster. But for the same Purpose, he afterwards dresses with Tents of Lint dipt in Cerate, which Tents he renews every third Day, gradually enlarging them, but never exceeding the Thickness of a Goose-quill; and afterwards he gradually diminishes the Thickness of the Tents before the Wound is quite healed [a]: By which means he asserts, that the foul Bones will cast off and separate spontaneously, without the Help either of actual or potential Cautery, and a new Passage will be formed for the Tears from the lacrymal Sack to the Nose. If any Splinters or Asperities of Bones offer themselves in the Cure, they must be removed, Sinuosities must be opened, and Ulcerations in the *Membrana Schneideriana* and lacrymal Sack deterged with *Lap. infernalis*, or other Escharotics. At every Dressing the Patient must close his Nostrils, and endeavour to force the Air through the new-formed Duct, to discharge the Sordes, and clear the Passage, which must be afterwards filled with a Tent dipt in Oil [b], and covered with a Plaster: And when the Sides of this artificial *Canalis nasalis* appear consolidated, the Tent is omitted, and the Plaster only used till the external Wound is also cicatrised, which, he says, will generally be within the Space of six or eight Weeks. And, lastly, towards the End of the Cure, when the Parts are near cicatrised, you may inject some proper Liquor through the *Punctum lacrymale*, which, by passing into the Nose, will demonstrate whether you have rightly succeeded.

An Observation on the Method of ANELIUS.

XXIV. With regard to the Method of curing lacrymal *Fistulæ* by Probing and Injecting, proposed by ANELIUS, SCHOBINGERUS, in pag. 22. of his Dissertation on this Subject, writes, that it is almost universally rejected, or forgot, because it requires an uncommon Dexterity or Slight in the Administration thereof. I grant, indeed, it may be rejected, or forgot, by those who are ignorant of the *Encheiresis* of the Operation, and Anatomy of the Parts. But, for my own Part, it is my general Practice, and I find no Difficulty in it: Though one would imagine, from the Description SCHOBINGERUS gives of it, that he could scarce at all perform it, not being sufficiently versed in its *Encheiresis*.

[a] I question whether it be absolutely necessary to observe all these Circumstances minutely.

[b] 'Tis the general Advice of Surgeons, never to apply Oil or Fat to injured Bones: And, as I can see no Reason why it should be applied to these tender ones, I think it is safer to use a Tent dipt in *Sp. Vini rect.* or some Tincture, rather than Oil.

Some Errors of M. GARENGEOT.

XXV. It is alſo remarkable, that M. GARENGEOT, in his *Operations*, paſſes by this Method of ANELIUS with little or no Mention of it, as a Thing of no Conſequence: And, in his Treatiſe of *Inſtructions*, he deſcribes it ſo lamely, that one may be ſatisfied he never attempted or performed it. The Probe, too, which he figures for this Operation, is ſo ſlender and weak, and ſo ill-ſhaped towards its upper End, that one can never be able to open the naſal Canal by it. He likewiſe repreſents the End of the Tube for the Syringe ſo ſlender, that it muſt be impoſſible for it to have any Perforation or Cavity as it ought; beſides which, it will be apt, like a Needle to run into the Eye-lid itſelf inſtead of the Duct. Laſtly, he directs to uſe a *Speculum Oculi*, inſtead of the Fingers, to ſecure the Eye-lids in this Operation, which *Speculum* he figures double, ſo that the Operator will be more obſtructed than aſſiſted by the Inſtrument: When the whole Buſineſs may be performed with the greateſt Eaſe by the Fingers only, according to the Directions given by myſelf, and ANELIUS, for above theſe twenty Years paſt, and as I have above an hundred Times performed it. In the next Place, M. GARENGEOT writes, that the lacrymal Probe cannot be conducted into the naſal Canal, becauſe ("*le Detour eſt trop grand*") of the great Incurvation of the Paſſage to it; whereas the Probe may be thus conducted without Difficulty by one verſed in the Artifice, and acquainted with the Courſe of the Ducts. And ſo far is the Thing from being almoſt impoſſible, as he aſſerts it to be, that I readily performed it above twenty Years ago, barely after the Reading of ANELIUS's Account of it, without ſeeing it done by another. I muſt indeed own, that ſeveral Surgeons have, at Times, applied themſelves from *Hamburg*, and other remote Parts, to me at *Helmſtadt*, to inſtruct them in the *Encheireſis* of this Operation, which they before thought impracticable, becauſe they had ſeveral Times miſcarried in it: But, after they had been ſhewn the Artifice a few Times by me, they found no Difficulty in performing it themſelves. I had once a Student in Divinity under my Care for a lacrymal Fiſtula, who, after having ſeen me paſs the Probe every Day for ſome Time through the *Punctum lacrymale* and naſal Canal into his Noſe, could, upon trying, eaſily perform the ſame himſelf by looking in a Glaſs; and became, at length, ſo expert in it, as to paſs it with more Nimbleneſs and Dexterity than I could myſelf: For by that Time you would imagine the Probe entering the lacrymal Punctum and Duct, he had ſlipt it alſo inſtantly through the lacrymal Sack and naſal Canal into his Noſe; which Proceſs he would repeat ſeveral Times in an Hour, without any Difficulty or Uneaſineſs, and there leave the Probe, to keep the Paſſage open. I have been the more prolix on this Artifice, to refute the Impoſſibility of it, and demonſtrate M. GARENGEOT not only unſkilled in the Operation, but even ignorant of the chief Uſe of the Probes which he repreſents, when he ſays, they ſerve only to ſearch out the lacrymal Sack: Whereas the chief Deſign of them is to open the obſtructed Cavity of the naſal Canal, in the watery Eye and lacrymal Fiſtula. Nor does the aforeſaid Gentleman ſo much as mention the Name of ANELIUS, the Inventor of theſe lacrymal Probes and Syringe; for what Reaſon I muſt leave others to judge. Conſult MORGAGNI, in *Adverſar. Anatom.* VI. 64.

XXVI. Nor muſt I omit mentioning here a Method of PETIT's; which is this: He makes an Inciſion in the lacrymal Sack; into which he introduces a grooved Probe, paſſes it into the Noſe, and, by this Means, opens the Canal.

Through

Through the Groove in the Probe he admits a Wax-candle (Fr. *Bougie*) to keep the Duct open. This Candle he changes once a Day, till he thinks the internal Surface of the Canal is perfectly cicatrised; and he uses it no longer. The Tears now pass, as usual, from the Eyes into the Nose, and the external Wound is closed in two or three Days. But I know by Experience, that this Method does not always succeed.

Authors divided as to the Treatment of these Fistulæ.

XXVII. From what has been said in this Chapter, it will manifestly appear that there are various Methods of treating lacrymal *Fistulæ*, according to different Authors, and the several Species of the Disorder: Insomuch that there is not any one Operation in Surgery besides, in which Surgeons are less uniform or more unsettled in their Practice. You will find this Disorder considered more largely, with many other different, but less considerable Methods of treating it, in our professed Dissertation *De Fistula lacrymali*, *Altorf.* 1716.

The Author's Method of treating lacrymal Fistulæ.

XXVIII. It now remains for me to acquaint the Reader briefly with the Methods in which I myself usually treat these *Fistulæ*. And first, in the Beginning of the milder Species, I approve of the Method of Probing and Injecting, contrived by ANELIUS: Which I usually continue for the Space of several Days or Weeks, according to the Nature of the Disorder, and especially when I perceive it diminish by this Practice. But when I find little Benefit result from it, I have Recourse to the Knife, with which I carefully lay open the Skin and lacrymal Sack, by an oblique or semi-lunar Incision; then waiting till the Hæmorrhage ceases, the next Day I perforate the *Os unguis* into the Nose, by the Instrument for this Purpose in *Tab.* XVI. *Fig.* 24. or *Tab.* XXIV. *Fig.* 2. In performing which, I observe the several necessary Circumstances, as I have before directed. After washing the Wound with warm Wine, I first fill the new-formed Duct with a Tent, and a Day or two after with a Piece of Wax-candle, or a Leaden Plummit, about the Thickness of the Instrument at *Fig.* 21. A, dipped in some Balsam or some mineral Water, till the Canal is completely formed; to effect which the sooner, I now and then touch the Surface with a Stick of *Lap. infernal.* after the Tent or Candle is extracted: And in this Method I continue three or four Weeks, or longer. I next insert a small Canula of Lead, Silver, or Gold, *Tab.* XVI. *Fig.* 25. from PLATNERUS, and heal up the Wound over it: But as the Bore of that Canula often proves too small to transmit the viscid Juices of these Parts freely into the Nose, I generally prefer one that is a little larger, as at *Fig.* 26. which I insert, and heal up the Wound over it as before. The Tube thus left in the new-formed nasal Canal, is generally so far from being uneasy to the Patient, that I have known many who could not tell whether the Tube was left in or not, after their Cure was compleated. But to prevent any Obstructions, or other Accidents, towards the End of the Cure, the Day after I have closed the Lips of the Wound, I inject some *Decoct. Veronicæ* (or some mineral Water) several times every Day through the *Puncta lacrymalia* by the Syringe of ANELIUS, that the Tears may have a clear Passage to the Tube. I must indeed confess, that though these Tubes will generally very well suffice to convey the Humours into the Nose, yet, in some malignant *Fistulæ*, when the Tubes are not large, they do not answer their Intention, but leave the Patient molested with a watery Eye. I never yet used the actual Cautery for the Cure of these *Fistulæ*, and I really think it is hardly ever necessary, notwithstanding many Authors lay so great a Stress upon it. But on the contrary

contray, I imagine the Baſis of the Cure to conſiſt in making an artificial naſal Canal ſufficiently large, by the Method here preſcribed; ſo that it may not eaſily be again cloſed or obſtructed. Even if you meet with a Caries in the *Os unguis*, it may be very well removed without the actual Cautery. And laſtly, you may from hence conclude, thoſe perforating Inſtruments and *Canulæ*, which are too ſmall to make an ample Paſſage through the *Os unguis* into the Noſe, not well adapted to ſucceed in this Operation.

Cautions. XXIX. I think it will not be improper to cloſe this Chapter, by giving the young Surgeon a few Cautions with regard to our preſent Subject. And firſt, it will be neceſſary for him to keep the Patient's Body open with lenient Purges, eſpecially when he is to call in the Aſſiſtance of the Knife; not neglecting to open a Vein in plethoric Subjects, and to repeat it upon the Approach of inflammatory Symptoms after the Operation. 2. In Patients of an ill Habit, afflicted with theſe *Fiſtulæ*, the Juices muſt be corrected by the Uſe of alternate and evacuating Medicines before and after the Operation, eſpecially a Decoction of the Woods, and a mercurial Purge now and then. (3.) If the lacrymal Fiſtula be attended with ſome other Diſorder, a Regard muſt be had to treat the latter with proper Medicines ſeparately. (4.) With regard to the Surgeon's Poſture for performing this Operation, I uſually do it ſtanding: But PLATNERUS performs it ſitting, almoſt in the Manner of couching a Cataract. *Diſſ. de Fiſt. lacrym.* pag. 41. (5.) The ſame Author directs (pag. 43.) to remove the *Perioſtæum* from the Bone in this Operation, alſo to divide and extirpate the lacrymal Sack by a tranſverſe Inciſion, after ſeparating it from the *Os unguis*. But as I can ſee no Reaſon for this Practice, I never came into it, and yet I cured my Patients equally well: And therefore of two Evils, the leaſt is to be choſen. (6.) In order to cure the *Hernia* of the lacrymal Sack, PLATNERUS adviſes to open it with the Scalpel, and afterwards to heal it with *Balſ. de Mecha*, that the Sack may be contracted, and rendered firmer by the Cicatrix. I myſelf have ſucceeded in this Practice: But then, a few Days after the Inciſion, I touched the Lips of the Wound every Day with *Lapis infernalis*, and injected afterwards a Decoction of *Veronica cum pauxillo Sp. Vini*. (7.) In a Caries of the *Os unguis*, PLATNERUS adviſes not to perforate it, but to burn it through into the Noſe by the actual Cautery, according to the antient Practice. But as this ſevere Practice is not attended with any Advantage, and as the Caries of the Bone may be removed by perforating it without Fire, I prefer the milder Method. (8.) In cutting theſe *Fiſtulæ*, M. GARENGEOT adviſes to divide the *obliquus inferior* Muſcle of the Eye, if it appears bare of its Fat: But as he gives no Reaſon for this Practice, which may be followed with dangerous Conſequences to the Eye, I think it ought to be rejected. (9.) The ſame Author aſſerts, that the new Perforation into the Noſe cannot be kept open, and that therefore the Tears will not have a Paſſage thither after the Operation: Alſo, that the *Puncta lacrymalia* will be uſeleſs after the Operation. But, if this be compared with what has been here advanced, and tried by the Experience of myſelf and others, the Reader muſt naturally conclude that Gentleman to be but little verſed in Diſorders of the Eyes, which is alſo proved from his not mentioning what has been propoſed on this Subject by ST. YVES, WOOLHOUSE, and LEMORIERE.

An

Plate 16.

Fig. 1.
Fig. 2.
Fig. 3.
Fig. 4.
Fig. 5.
Fig. 6.
Fig. 7 & 8.
Fig. 9.
Fig. 10.
Fig. 16.
Fig. 17.
Fig. 18.
Fig. 19.
Fig. 13.
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Fig. 14.
Fig. 24.
Fig. 20.
Fig. 25.
Fig. 22.
Fig. 23.
Fig. 26.
Fig. 27.
Fig. 28.
Fig. 31.
Fig. 21.
Fig. 30.
Fig. 29.

An EXPLANATION *of the* SIXTEENTH PLATE.

Fig. 1. Repreſents an obtuſe pointed Hook, to draw the Eye-lids aſunder in ſome Operations: It was ſent me under the *French* Name *Hameçon plat*, or the flat Hook. A is the flat End; B the Handle.

Fig. 2. Repreſents the Needle A, fixed in a Handle B, for elevating and diſſecting the ſmall Blood-veſſels on the *Conjunctiva* and White of the Eye; as alſo to elevate and diſſect a *Pterygium*.

Fig. 3. Denotes a Beard of Rye or Barley, to make the Bruſh or Scarificator: In which A denotes the ſmall Hooks and Points which ſcarify the Blood-veſſels of the Eye.

Fig. 4. Is an Eye-bruſh compoſed of twelve or fifteen of the foregoing Beards: A the Handle; B the Part which ſcarifies.

Fig. 5. Is the Eye-raſp of CELSUS and AEGINETA, made in Shape almoſt like a Spoon: A the Handle; B the rough and convex Part, with which the Antients ſcarified the Eye-lids. This I received from M. MAUCHART. We have another a little different from this repreſented by PLATNERUS, *in Diſſert. de Scarif. Oculor.*

Fig. 6. Repreſents the Left Eye: Whoſe two *Puncta lacrymalia* are denoted by *a a*, and the lacrymal Caruncle betwixt them is marked *b*.

Fig. 7 and 8. Exhibit a View of the lacrymal Ducts, as they paſs from each Eye into the Noſe: *a a* the lacrymal Sack; *b b* the *Puncta lacrymalia*; *c c* the Ducts which lead from the two *Puncta* into the Sack; *d d* the naſal Canal; *e e* the Opening of the ſame Canal into the Noſe.

Fig. 9. Shews the Manner in which the before-deſcribed Ducts are ſituated and diſpoſed with regard to the Eye: *a a* the *Puncta lacrymalia*; *b* the lacrymal Caruncle; *c c* the Ducts which lead from the *Puncta* to the lacrymal Sack: *d* the ſaid Sacculus; *e* the *Canalis naſalis*; *f* the Aperture of it into the Noſe.

Fig. 10. Shews an *Anchylops*, and a *Hernia* or Diſtenſion of the lacrymal Sack.

Fig. 11. Is a very ſlender Probe of Silver Wire, a little crooked, and armed with a ſmall Head or round Point, for opening and clearing the lacrymal Ducts and naſal Canal, when they are obſtructed in *Fiſtulæ*, or a watery Eye, as propoſed by ANELIUS.

Fig. 12. Is another Probe of the ſame Kind, and for the ſame Uſe, but ſtronger; which I uſe in more obdurate Obſtructions of theſe Parts.

Fig. 13. Is another Kind of Probe, which I now uſe for the ſame Intentions, but more conveniently, as it is ſhorter.

Fig. 14. Is a ſmall Silver Syringe, as deſcribed by ANELIUS, to inject Liquors through the *Puncta lacrymalia*: A the Tube which enters the lacrymal *Punctum* and Duct; B the Handle of the Sucker; C, D, the hollow Cylinder.

Fig. 15. Is another ſmall Tube of a different Make, which may be adapted to the End of the Syringe by the Screw B.

Fig. 16 and 17. Demonſtrate the ſeveral Ways in which the lacrymal Sack may be diſtended or relaxed.

Fig. 18.

Fig. 18. Shews how an Abſceſs or Tubercle may be formed, ſo as to deſtroy the lacrymal Duct; *a* that upon the upper Duct, *b* one upon the lower Duct, like that which I ſaw in the Duke of SAVOY.

Fig. 19. Repreſents a complete lacrymal Fiſtula: *a* one with a pretty large Opening; *b* one with a narrow Opening; the Line *b c* denotes the Courſe for Inciſion in theſe *Fiſtulæ*.

Fig. 20. Is a Steel Inſtrument for compreſſing the lacrymal Sack, from PLATNERUS: A the Bolſter which is impoſed on the lacrymal Sack; B the Hinge; C the Screw which preſſes the Bolſter on the Sack; D the upper Part which goes over the Forehead; E a Hook which goes into the Holes of the Strop, to ſecure the whole upon the Head.

Fig. 21. Is an Iron Cautery, for perforating the *Os lacrymale*.

Fig. 22. A Canula adapted to the preceding Cautery, to be fixed upon the Bone before the Cautery is applied.

Fig. 23. Repreſents an Inſtrument made of Silver or Braſs: Which in the Part marked *a* is made hollow like a Spoon, to cover and ſecure the Eye, while the Cautery is paſſed through the Aperture *b* to the carious Bone; *c* the Part which ſerves for a Handle. This may alſo ſerve to cover the Eye when you cut for the *Fiſtula lacrymalis*.

Fig. 24. Repreſents an Inſtrument for perforating the Integuments, lacrymal Sack, and Bone, at the ſame time; or you may only perforate the Bone with it, after the lacrymal Sack is opened by Inciſion. A the Point; B the Handle.

Fig. 25. A B denote ſmall Tubes to be inſerted into the Perforation of the *Os unguis*, according to WOOLHOUSE and PLATNERUS, and to heal up the Wound over it.

Fig. 26. Is a Tube of the ſame Kind, but a little larger; which I uſe for the ſame Purpoſe, and may be beſt made of Lead or Gold.

Fig. 27, 28. Are Silver Tubes uſed by PLATNERUS, to keep open the new-made Paſſage to the Noſe, till it is become callous or cicatriſed.

Fig. 29. Repreſents the Forceps of LEMORIERE: A the ſharp-pointed and crooked Beak, which perforates the *Os unguis*; B B its Handles, by which you open and ſhut its Beak.

Fig. 30. Repreſents the Head only of the ſame Forceps, opened as it is when you dilate the Parts, after perforating the *Os lacrymale*.

Fig. 31. Denotes the Shape of the Piece of Wax-candle, which LEMORIERE uſes inſtead of a Tent, to keep open the Perforation to the Noſe: A its Head; B that End which goes into the Noſe.

Of OPERATIONS on the EYES.

CHAP. LVI*.

Of SUFFUSIONS *or* CATARACTS.

I. AFTER having conſidered the Diſorders of the Parts adjacent, we come now to thoſe of the Eye itſelf: The chief of which is that termed a *Suffuſion* by the Antients, and a *Cataract* by the Moderns. The *Greeks* call it *Hypochyma* and *Hypochyſis*; the Deſcription of which Diſorder has been very imperfect, till of late. We deſcribe a Cataract or Suffuſion, with the generality of Oculiſts, to be a Diſorder of the Humours in the Eye; by which the *Pupilla*, which ought to appear tranſparent and black, looks opaque, and of ſome other Colour, as inclining to white, grey, blue, brown, *&c.* And thus Viſion is variouſly impeded, or totally deſtroyed. A Cataract deſcribed.

II. It is remarkable that the generality, and even the moſt eminent Surgeons and Phyſicians, have been all along greatly deceived, till within the preſent Century, both as to the Seat and Cauſes of the Cataract. Moſt of them believed it to be a Pellicle, or membranous Subſtance, formed always in the aqueous Humour. Whereas the moſt expert Surgeons and Oculiſts have of late Years found, that, by repeated Diſſections of the Eye thus diſordered, there is hardly ever any white Membrane or other foreign Subſtance to be found in the aqueous Humour; but that it is almoſt conſtantly an Opacity in the cryſtalline Lens; and therefore the true and common Cauſe of a Cataract is, according to myſelf and the reſt of the Moderns, an Opacity of the Cryſtalline, and not any thing in the aqueous Humour, as the Antients ſuppoſed. Indeed the Antients might have been led into this Error very eaſily, from the Appearance which the Diſorder affords, without diſſecting the Eye: For, by barely inſpecting that diſeaſed Organ, the opake Cryſtalline looks like a Membrane in the aqueous Humour; by couching or depreſſing which, with a proper Inſtrument, the Eye recovers its former Viſion. This is comfirmed by various Obſervations and Experiments made by ſeveral eminent Members of the Royal Society at *London* and *Paris*, and the *Commerc. Literar. Norimberg.*; and may be ſeen, conſidered more at large, in our profeſſed Treatiſe *De Cataracta*, Cauſes according to the Antients.

* M. GARENGEOT here is much to be commended; that is, his Treatiſe of *Chirurg. Inſtruments*, *Tom.* I. *Cap.* XIV. *p.* 414. He laments and inveighs againſt the Negligence of Surgeons in leaving the Operations on the Eye wholly to Mountebanks and Strollers: And exhorts them earneſtly to vindicate this moſt noble Branch of Surgery to themſelves (though at preſent few are furniſhed even with proper Inſtruments) and to beſtow due Pains and Attention upon it. Yet I cannot but wonder, that amongſt all his *Chirurgical Operations*, this very Gentleman ſhould deſcribe in his Writings, or point out to his Pupils, but one relating to the Eye: Which is the Operation peformed in the *Fiſtula lacrymalis*. This confirms me in what I hinted in the foregoing Chapter, that he was not very converſant in the Cure of theſe Diſorders.

Glaucomate, & Amauroſi, An. 1713. and in our Apology for, and our Vindication of, the ſame, *An.* 1717 and 1719[a].

The firſt Diſcoveries of the true Cauſe.

III. It is almoſt eighty Years ſince the preceding Error of the Antients, with regard to the Cauſe of Cataracts, began to be publickly remarked by M. QUARE, ROLFINCKIUS, GASSENDUS, RAUHAULT, BORELLI, and others. But theſe Gentlemen having but few Obſervations to eſtabliſh their truer Notion of the Diſorder, their Obſervations were not only thought, by the generality, to be anomalous, but even the old Error, of Cataracts being conſtantly formed by a Membrane, ſtill prevailed; and the rather, becauſe there were few or none who took the Pains to diſſect any Eyes affected with this Diſeaſe. But at length M. BRISAC and MAITRE-JEAN, by new Experiments and Diſſections of Eyes thus affected, demonſtrated apparently, that Cataracts aroſe not from any Membrane, but an Opacity of the cryſtalline Lens[b]. But though theſe laſt Gentlemen were much miſtaken, in thinking themſelves the firſt Propoſers of this Diſcovery; yet their Merit is not inconſiderable, for having more carefully proved, and demonſtrated by inconteſtable Obſervations and Experiments, what had been ſtarted by their Predeceſſors, and at that Time almoſt buried again in Oblivion. For, to ſay nothing of myſelf, the whole Drift of the Eſſays and Obſervations on this Subject, given us by the Learned in *France*, *England*, and *Italy*, tends largely to prove, that the ordinary and *moſt common Cauſe* of Cataracts is from an Opacity of the cryſtalline Lens.

The Author's Opinion.

IV. I ſay only the moſt common Cauſe of Cataracts is from an Opacity of the Cryſtalline; without abſolutely denying, as ſome do[c], that a membranous Subſtance may be ſometimes formed in the Eye, ſo as to cauſe the like Diſorder. I rather recommend this Point to be decided by further Obſervation and Experiments. For though when I firſt wrote on the Cataract I was furniſhed with five Obſervations of my own, beſides thoſe of BRISAC and MAITRE-JEAN, in which an Opacity of the Cryſtalline appeared to be the ſole Cauſe; yet I even then entertained an Opinion, and afterwards declared it, that I thought a Membrane, or other ſolid Body, floating in the aqueous Humour, might ſometimes alſo cauſe a Cataract, as I once obſerved in diſſecting a recent Subject. Nor has this Caution of mine turned out uſeleſs to others, ſince I received a Letter from Profeſſor WIDEMANNUS, Director of the *Acad. Natur. Curioſ.* which aſſures me, he found and demonſtrated ſuch a Membrane to ſeveral eminent Phyſicians of *Norimberg*, as LOCHNER, THOMAS, and GOCKELIUS, in both the Eyes of a Woman who had Cataracts: But then he at the ſame time obſerved in one Part of the Cryſtalline an incipient, and in the other Part a complete Opacity. After the Operation, which was performed three Years before the Woman died, ſhe became quite blind of that Eye whoſe Cryſtalline was wholly opake; and with the other Eye, whoſe Cryſtalline began to be obſcured, ſhe could only diſcern and diſtinguiſh large Objects. A Caſe much like this LANCISI tells

[a] PLATNER, a Pupil and Friend of WOOLHOUSE (in *Program. Anatom.* 1736. relates, that in the Eye of a Female Patient who had a Cataract) he found no Pellicle or membranous Subſtance; but the Cryſtalline Lens was opake, and leſs than uſual. So that even WOOLHOUSE's Pupils agree with me, that this Diſorder is not properly called a *Glaucoma*, but a *Suffuſion*.

[b] This is the Opinion received and defended by the preſent *Engliſh* Oculiſt, TAYLOR, in his Pamphlet on the Cataract, *Lond. An.* 1736.

[c] Among theſe I am reckoned as one by TAYLOR, in *Page* 5. of his ſaid Pamphlet; but unjuſtly, ſince my Writings on the Subject demonſtrate the contrary.

me

me he obſerved in GARELLI, *Archiater* to the Emperor, upon diſſecting whoſe Eyes he found a whitiſh Membrane in each, floating in the aqueous Humours: But then here again the Cryſtallines were yellowiſh and ſomething obſcure, though his Eyes had never undergone any Operation while he lived. Thus theſe Membranes ſeem generally attended with a Diſorder of the Cryſtalline. From theſe and a few of the like Obſervations, it appears, that a Cataract may ſometimes be cauſed by a Membrane in the aqueous Humour, though generally and moſt frequently from an Opacity of the cryſtalline Lens.

V. Though an Opacity of the cryſtalline Lens appears, from Obſervation and Experiment, to be the common and moſt frequent Cauſe of Cataracts; yet it has been denied by ſeveral [a], many of which have no other Reaſon to offer, than that they think it very extraordinary, and almoſt impoſſible, that ſo many eminent Phyſicians, and profeſſed Oculiſts, ſhould have been thus miſtaken, for ſo many Ages, in judging it to proceed from a Membrane. Others think the Method of curing this Diſorder, by couching or depreſſing the cryſtalline Lens, is ſo ſevere and dangerous an Operation, that it muſt inevitably deſtroy the whole Sight of the Eye, becauſe they judge the Cryſtalline to be abſolutely neceſſary for Viſion. But how egregiouſly theſe are miſtaken, may appear from the ſingle Inſtance of the expert Anatomiſt WENCKERUS: Who found both the Cryſtallines at the Bottom of the Eyes many Years after he had couched; the Patient, in the mean time, enjoying his Sight very well, eſpecially with one Eye, even to his Death, when they were diſſected. A like Obſervation we have, given us by BENEVOLI, firſt ſeparately, *Florent. Anno* 1722, and afterwards joined to a Treatiſe *De Caruncula in Urethra:* To which add the ſeveral Experiments made by the *French*, mentioned long ago in my Treatiſe on the Cataract. There are ſome again who, being fond of cavilling about Words, contend that ſuch an Opacity of the Cryſtalline ought rather to be called a *Glaucoma* than a Cataract; but with no more Reaſon on their Side than the former. This Diſorder of the cryſtalline Lens affords the ſame diagnoſtic Symptoms, and is cured by the ſame Practice with what has all along obtained among the Antients in their Suffuſion or Cataract: And therefore this Diſorder really is, or at leaſt deſerves the Name of their Cataract. On the contrary, we find that a *Glaucoma* is all along deſcribed by the moſt expert Surgeons and Phyſicians, as a Diſeaſe which very ſeldom happens, and which is wholly incurable. There are other frivolous Objections ſtarted, which the Reader may ſee refuted more at large in our Treatiſe on the Subject, with the Apology for the Vindication of it. We therefore aſſert, that a Cataract is hardly ever cauſed by any Membrane, or other Body floating in the aqueous Humour: Becauſe it appears from Experience, that out of fifteen Patients, you ſhall hardly find one Cataract cauſed by a Membrane, all the reſt proceeding from an Opacity in the cryſtalline Lens. And conſequently we may depend on what has been advanced by the moſt expert Sur-

Aſſerters of membranous Cataracts refuted.

[a] We have a Diſſertation *De Cataracta*, publiſhed in 1721, at *Straſburg*, by FREYTAGIUS; in which he aſſerts the general Cauſe of Cataracts to be a Membrane in the aqueous Humour; but, inſtead of proving it anatomically, he would perſuade us, he had ſeen his Father extract ſuch Membranes with a Hook above an hundred Times: But few will believe him, who know any thing of the Diſorder, and what has been advanced concerning it by others.

geons in *France*[a], *England*[b], and *Italy*[c], viz. *that the common Cauſe of Cataracts is not any Membrane, but an Opacity of the Cryſtalline*, notwithſtanding what others may ſay to the contrary.

Diagneſis. VI. From what has been ſaid, it will be no difficult Matter to diſtinguiſh a Cataract from the reſt of the Diſorders of the ſame Organ. For, 1. it differs from an Amauroſis, or *Gutta Senera*, which ſome call the black Cataract: Becauſe in this laſt the Eye loſes the Sight without any viſible Diſorder in the Eye, or any Change in the Appearance of its Pupilla. 2. An *Albugo*, or white Speck in the Eye, is not behind the Cornea and Uvea, as is the Cataract, but in the *Cornea* itſelf. 3. The *Ungula*, or *Pterygium*, is a preternatural Tunic without-ſide the *Cornea*. 4. The *Hypopium* is indeed ſeated behind the *Cornea* in the aqueous Humour; but then it conſiſts of a purulent and fluctuating Matter: Whereas the Cataract is a ſolid Subſtance. 5. A *Glaucoma* does indeed appear in a great meaſure like a Cataract, ſo as to deceive many, if they do not conſider that though both of them are ſeated behind the Pupilla, yet the *Glaucoma* being in the vitreous Humour, lies deeper than the Cataract, whoſe Seat is in the Cryſtalline: Therefore the firſt will generally appear of a darker blue, or a grey Colour, as its Name imports: Whereas the Cataract uſually appears of a Pearl Colour, and ſeated immediately behind the Pupilla: Add to this, that it has been conſtantly obſerved by Phyſicians, that the *Glaucoma* very rarely happens in Compariſon with the Cataract: And when once it is formed, there is no Poſſibility of removing it, which cannot be ſaid of the opake Cryſtalline.

Species of Cataracts. VII. Cataracts have been diſtinguiſhed by Surgeons and Oculiſts into various Species. As, 1. By the Time of their ſtanding, into *recent* and *inveterate*. 2. By their Growth, into *incipient* and *confirmed*. 3. Into *mature*, when the Pupilla is totally obſtructed; and *immature*, when the Pupilla being but partly obſcured, the Patient is as yet capable of perceiving Objects. Some Cataracts never come to Maturity, or at leaſt but very ſlowly. 4. According to the Symptoms, Cataracts are again diſtinguiſhed into *ſimple* and *complicated*: The latter being when the Cornea, Uvea, or vitreous Humour are alſo affected, or when the Pupilla is immoveable, too much contracted, or adheres to the adjacent Parts. Sometimes there is a Tabes of the Eye attending it; and at other Times it is joined with ſome Diſorder of the Retina, or optic Nerve. 5. Cataracts are generally immoveable, but ſometimes they tremble or fluctuate upon touching the Eye with the Finger, being then called a *ſhaking Cataract*. 6. Almoſt all of them are of different Shades, though they approach nearly to the ſame Colour, to wit, that of Pearl, whitiſh, or grey, and are accordingly denominated *white* or *grey Cataracts*. We do not frequently meet with Cataracts of a yellow or greeniſh Colour, and ſeldom with any marbled, or looking like Cheeſe, or like a glowing Iron. 7. In ſome Cataracts the cryſtalline Lens degenerates into a milky Fluid, and in others into a purulent Matter, like that of Abſceſſes: And in couching theſe, the Matter will eſcape, and confuſe the Humours of the Eye upon breaking the Capſule of the Cryſtalline with the Needle. And hence again we have a Diſtinction of Cataracts into *milky* and

[a] M. PETIT and MORAND, in *Hiſt Acad. Reg. An.* 1722, 1723. and ST. YVES of *Paris*, in his Book on *Diſeaſes of the Eyes*, Chap. *on the Cataract*.

[b] Mr. CHESELDEN, and others, in *Phil. Tranſact.*

[c] As MORGAGNI, SANTORINI, COCCHUS, BENEVOLUS, &c.

purulent. 8. Cataracts are again uſually diſtinguiſhed by Oculiſts into *true* and *ſpurious:* By the firſt, we mean one in which the Opacity appears immediately behind the Pupilla; but the ſpurious is, when the Opacity ſeems to be ſeated otherwiſe. Laſtly, 9. Cataracts are not undeſervedly diſtinguiſhed into curable and incurable: For thoſe of a grey or whitiſh Colour are the moſt eaſily cured. To theſe we may add ſuch as have no Colour, the Patient being ſenſible of Light and Darkneſs: Alſo thoſe, in which the Pupil does not adhere, but can contract and dilate itſelf. On the contrary, you can have no great Hopes of curing complicated or fluctuating Cataracts, in which the Patient can neither perceive Light nor Darkneſs, and in which the Pupilla or Uvea adheres, is immoveable, and either contracted or dilated; or when it appears of the unuſual Colours at 6. and 7. preceding. We find ſome again diſtinguiſhing Cataracts into *common* and *uncommon.* By the firſt, they intend ſuch Opacities of the Cryſtalline as appear of a whitiſh Colour; and by the laſt, they mean thoſe of any other Colour: Which indeed differ very remarkably from the former, in appearing not convex, like them, but flat or convave, as we have lately obſerved ſome, and as I find it alſo remarked by the accurate Oculiſt M. ST. YVES, in his Treatiſe on the Diſeaſes of this Organ.

VIII. We before demonſtrated, that the common and uſual Cauſe of Cataracts is an Opacity of the cryſtalline Lens, and hardly ever a looſe Membrane. But to explain the Manner in which the Cryſtalline becomes thus obſcured, we muſt conſider, that when the Juices are too thick and glutinous to paſs freely through the very minute ſerous Veſſels of this Body, they ſtagnate and obſtruct thoſe Veſſels, which become afterwards contracted and dried. Thus it may be formed in various inflammatory Diſorders of the Head and Eyes; and particularly after ſome external Violence has injured that Organ, as a Fall, Blow, Burn, *&c.* or expoſing the Eyes too much to the Heat of the Summer Sun, or an intenſe Fire. *Cauſes.*

IX. The principal Sign of a Cataract is, therefore, a ſmall Cloud, or whitiſh Opacity of the Cryſtalline. To ſatisfy your Patient whether it may be cured by couching, you ought to be firſt well aſſured, whether it be of the mature or immature Kind: For if it be of the latter, the Operation will be abſolutely miſchievous. The Signs of a *mature* Cataract, fit for couching, are, when the Pupil having loſt its native Blackneſs appears moveable, and equally of a duſky Hue, the Patient being ſenſible of Light and Darkneſs, but incapable of diſtinguiſhing Colours. On the contrary, you may judge it to be *immature*, if the Opacity is not equally ſpread behind the Pupil, the Patient being as yet able to ſee Objects imperfectly, eſpecially upon turning his Back to the Light. But, if the Patient can neither diſcern Light nor Darkneſs, it is a Sign the Retina or optic Nerve is greatly affected, and that the Diſorder is an *Amauroſis*, or *Gutta Serena*, for which no Cure can well be expected. You may alſo diſcover whether the Pupil adheres to the Cataract, and is become rigid, by obſerving whether it contracts or dilates itſelf in a ſtrong Light, or in the Dark; alſo if it does not move upon rubbing or touching the Eye with your Finger. If any ſmall Specks appear behind the Pupil, ſome Parts of the Cryſtalline are either inſpiſſated, or elſe ſome minute Pellicles are ſprouting from the Uvea, as I remember to have ſeen, and which may poſſibly unite into a Membrane. Sometimes only the Middle, the Margin, or elſe one half of the Cryſtalline is become opake; and *Diagnoſis.*

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in the first Case, Objects will seem to the Patient to be perforated in the Middle. If any Tunic appears plain or convex within-side the Pupil, it denotes the Surface of the Cataract, as ST. YVES observes.

Prognosis. X. There is scarce any Disorder, the Event of which is more uncertain than that of the Cataract: Which will sometimes admit of a Cure, and sometimes not. But, to say the Truth, Medicines will generally have little or no Effect, when the Disorder is confirmed or inveterate; notwithstanding what some may boast of their wonderful *Arcana* for this Purpose[a]. Almost the sole Relief is therefore to be had from the Surgeon's Hands and Instruments. We very rarely meet with Instances of this Disorder being cured by leaving it to Nature alone. And yet, by the Operation itself, a Cataract that bids fairest for Recovery, though treated in the most judicious Method, shall frequently be the worse for it; when one that seemed to be irrecoverable, shall be cured by the same Treatment, beyond all Expectation. However, a Cataract is much milder and more tolerable to the Patient than many other Disorders which we esteem desperate and incurable: Because neither the Disease nor the Operation are usually accompanied with intense Pain, nor Hazard to the Patient's Life. But, in the general, those Cataracts are most likely to be cured, which are mature and not complicated, the Patient being capable of distinguishing Light and Darkness, and the Pupil retaining its natural and free Motion. But there can be little Hopes of succeeding in those where the Pupil is rigidly contracted, the Uvea firmly attached to the Cataract; or where the Pupil, having lost its natural round Figure, is lacerated, angular, and variously distorted. The Success of the Operation is rendered still more doubtful, if the Patient is weak, aged, or afflicted with a violent Head-ach, or when the Eye is too much shrunk up, or enlarged and swelled. The Cataract is also the worse, as it degenerates more from the Pearl Colour: For the most unusual Colours always proceed from and denote the worst Affections of the Eyes. Yet even many of these are often cured by the Operation beyond Expectation, when the Eye is free from other Disorders. For the milky and purulent Cataracts, though there is Danger of the opake Matter mixing with the aqueous Humour in the Operation, so as to render the Success of it doubtful; yet it has been often observed by the most expert Oculists, that this Matter will subside to the Bottom of the Eye, and the Humours recover their former Clearness[b]. It is indeed difficult to couch a variegated or marbled Cataract, as being too soft, and not yet arrived to a due Consistence. Therefore when this Species does not give Way to Remedies, you ought to defer the Operation till the whole Pupil appears opake, which denotes the Cataract to be sufficiently mature. The Disorder has been judged the more difficult to cure, as it is more inveterate, by the antient Surgeons and Physicians: and yet it has been observed by some of the modern Oculists, that Cataracts, without other Disorders in the Eyes, may be often cured, though of twelve, eighteen, or even thirty Years standing, if the Eye is free from other Disorders. If the Patient cannot distinguish Light and Darkness, the Opera-

[a] HOVIUS audaciously asserts *(in Lib. De circulari Humor. in Oculis Motu,* pag. 122.) that he can thus, at any Time, cure all Sorts of Cataracts, whether recent or inveterate. But, upon the strictest Enquiry into the Truth of the Matter, I can meet with no Instances of his Success.

[b] See my Treatise on the Cataract, *p.* 255. See MAITRE-JEAN, Lib. *De Morb. Oculor.* Cap. *De Cataracta.*

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tion will be but of little more Service than for removing the Deformity of the Eye: Becauſe then the Cataract is accompanied with an *Amauroſis*, or *Gutta Serena*. In Infants the Operation is generally leſs ſafe, and more impracticable, than in Adults, by reaſon of their Impatience and Strugglings. Nor ſhould the Operation be performed on thoſe who have a Cough, Catarrh, Defluxions, and Vomiting, before thoſe Diſorders are firſt removed: Leſt, by the Patient's being diſturbed in the Operation by thoſe Symptoms, his Eye might be irrecoverably injured and ſpoiled for the future. In thoſe Cataracts which move or fluctuate from one Side to the other, there is generally little or no Hope of the Operation ſucceeding: But when the opake Body appears before the Pupil, it may then be ſometimes extracted through an Inciſion in the Cornea.

Treatment of doubtful Cataracts.

XI. When the Cataract appears even deſperate or incurable, I think it is better to attempt to reſtore the Patient's Sight by the Operation, though in vain, rather than leave him to certain Blindneſs without uſing the beſt Means: And this the rather, becauſe the Operation may be performed, without inducing intenſe Pains, or endangering the Patient's Life; which are indeed Reaſons ſufficient to deter moſt People from Lithotomy, and the more ſevere chirurgical Operations. When the Patient is blinded by the Cataract, he cannot be blinded again by the Operation, if it does not ſucceed. The leſs Proſpect there is of curing the Diſorder, the more Honour and Fame will the Operator acquire, by recovering the Patient's Sight beyond all Expectation.

Of the Gloucoma and Gutta Serena.

XII. Surgery can be of little or no Service towards the curing of a *Gutta Serena*, as hath been hitherto univerſally allowed: Till of late, the *Engliſh* Oculiſt TAYLOR has given out, that he can cure it by an Operation. The Falſity of this, Experience has demonſtrated. The Diſorder we now ſpeak of, is not ſeated in the anterior or middle Part of the Eye, but either in the Retina, the optic Nerve, or in the Brain itſelf, to which Parts no Operation can be extended. If there is any Room left to expect a Cure, it will be more reaſonable to attempt it by ſuch internal Medicines as will raiſe a Salivation, and purge; adding at the ſame time Phlebotomy, Scarification, and Setons or Iſſues, eſpecially thoſe on the coronal Suture, or in the Neck. What we have ſaid of the *Amauroſis*, or *Gutta Serena*, holds true in a worſe Degree of the *Glaucoma*: Which being an Opacity of the vitreous Humour, is univerſally allowed, both by the antient and modern Surgeons, to be incurable by any Operation whatever. It is remarkable, that this vitreous Humour is ſometimes ſo much indurated, as well as diſcoloured, that it reſembles a Cartilage; as appears from an Obſervation formerly communicated to me by the celebrated Anatomiſt and *Archiater* LANCISI.

The two Methods of curing Cataracts.

XIII. There are chiefly two Methods of curing Cataracts: Either by couching with the Needle, or by the Uſe of internal and external Remedies. It is true, there are ſome who reject all Methods of treating Cataracts by Medicines as uſeleſs and trifling: Yet I think there are ſome Caſes in this Diſorder which ought to be recommended to the Care of the Phyſician. Nor are there Inſtaces wanting, as well among the Moderns as Antients[a], of Patients, who, by the Help of Nature, aſſiſted with Medicines, have been freed from Cataracts beyond all Expectation; eſpecially when the Diſorder is incipient, and not firmly rooted or fixed in the cryſtalline Lens. But leaving the Phyſician to direct a

[a] *Vide* CELSUS *Lib.* VI. *Cap.* 6. and the modern Writers on the Diſorder.

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proper Regimen and Courſe of Phyſic adapted to the Patient's Habit, Age, and other Circumſtances, we ſhall here proceed immediately to deſcribe the Methods of curing Cataracts chirurgically, by the Help of the Hands and convenient Inſtruments; of which CELIUS has treated with great Accuracy.

Surgeons adviſed to be diligent in learning this Operation.

XIV. But firſt it may be proper for us to admoniſh Surgeons to make themſelves better acquainted with the Operation for couching Cataracts, and to be more converſant in the Practice thereof, and not to leave the Buſineſs to Quacks and itinerant Pretenders, as we have ſeen it done but too much of late[a]. If the Practice is, as we ſee often, well enough executed by theſe boaſting Pretenders, what might we not expect from the Hands of the more prudent and regular Surgeon, were he to engage more in this Practice: Which is, in reality, attended with leſs Danger or Hazard than the common Operation of Phlebotomy. For, in couching a Cataract, you run no Riſque of wounding a Nerve, Tendon, or Artery, as you do in opening a Vein. But leſt our Reader ſhould think we are recommending the Operation, for its Eaſineſs, to the Practice of every one, though ever ſo unſkilful; we ſhall here enumerate the ſeveral neceſſary Qualifications for an Oculiſt, whom we may venture to truſt in the Cure of this Diſorder. 1. He muſt be very well verſed in the anatomical Structure, and in the Functions of the ſeveral conſtituent Parts of the Eye, that he may avoid injuring any of them ignorantly. 2. He muſt be well acquainted with the beſt Inſtruments and Methods of operating, to be learned from a frequent and cloſe Attention to the Practice of ſome expert Maſter. 3. His Mind muſt be intrepid, his Hand ſteddy, and his Eye ſharp and quick-ſighted. 4. He ſhould be equally ready with his Left as with his Right Hand; that he may couch the left Eye with his Right Hand, and the right Eye with his Left Hand. 5. He muſt have made himſelf previouſly expert in the Practice, by repeated Trials upon the Eyes of Brutes, and of dead Men, before he ventures to couch the Eyes of the Living.

The Time of Couching; and previous Preparation of the Patient.

XV. But, in order to the more ſucceſsful and eaſy Performance of this Operation, it will be previouſly neceſſary for the Surgeon to appoint the moſt convenient Time, and to prepare his Patient in the beſt Manner, by a proper Regimen and Medicines. With regard to the firſt, ſuch a Seaſon ſhould be choſe, in which the Air is pretty temperate as to Heat and Cold, as in Spring and Autumn. The Day appointed for the Operation ſhould eſpecially be ſerene and clear, and the Hour generally in the Fournoon: Not but the Afternoon will do very well, and may be, in ſome Caſes, preferable for weak and timorous Patients, who are uſually in better Spirits after a moderate Dinner. The Apartment for couching the Patient in will be fitter as it is lighter, provided the Sun does not ſhine in upon you: For ſo ſtrong a Light as the Sun's Rays will cauſe the Pupil to contract itſelf, ſo that you cannot have ſo large a View of the Parts and Inſtrument within the Eye. As for the Preparation of the Patient, he ſhould not only obſerve a proper Regimen and Diet a few Days before the Operation, but he ſhould alſo in that Time take ſome alterative and evacuating Medicines, with the Uſe of Phlebotomy, to prevent the Eye from being moleſted by intenſe Pain, Inflammation, Suppuration, and perhaps a Loſs of the

[a] It is a little extraordinary, that M. GARENGEOT ſhould take no Notice of this Operation in his Treatiſe, as if it made no Part of Surgery.

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whole, after the Operation has been performed[a]. It may alſo be generally convenient to give the Patient a Clyſter, if he has not eaſed himſelf lately. And, that his Courage may not fail him, the Operator ſhould take Care that he may have ſome Gravy-Soop, or other ſtrengthening Suppings in the Morning, before he begins his Operation. Laſtly, nothing can more conduce to the Patient's Recovery, and the Prevention of Accidents, after the Operation, than to procure him a ſound Sleep afterwards by an Anodyne Draught or Emulſion; by which the Faculties both of his Body and Mind will be recruited, and the lately ſuppreſſed Cataract will not be apt to aſcend again.

Of the Aſſiſtants and Needles.

XVI. The Surgeon ought never to undertake the Operation by himſelf, but to provide two Aſſiſtants, one to hold the Patient's Head (as in *Tab.* XVII. *Fig.* 1. A.) and the other, to adminiſter the Needle and other Neceſſaries. But he muſt be more particularly provided with *couching Needles*, and with a *Speculum Oculi*. Of the *Speculum* you have two Forms at *Fig.* 15 and 16. and of the couching Needles there are a great many Kinds, the chief of which are repreſented in *Tab.* XVII. *Fig.* 2, 3, 4, 5, 6, 7, 8, 9, 10 and 11. The beſt of them are, in my Judgment, thoſe at *Fig.* 5, 6, and 10. All have a little broad and ſharp Point like a Tongue or like a Barley-corn, but flatter: And that at *Fig.* 6. with a Sulcus in its Point, ſeems better adapted to couch the Cataract, than any of thoſe which have either a narrower or a broader Point. For thoſe with too ſlender a Point, as in *Fig.* 2 and 4. do eaſily lacerate the Cataract: And thoſe with a more obtuſe Point, as in *Fig.* 8. meet with Difficulty in perforating the Coats of the Eye. For theſe Reaſons many Surgeons uſe two Needles in this Operation, one with a ſharp Point, (*Fig.* 7 and 9.) to perforate the Coats of the Eye, and the other with a broader or more obtuſe Point (*Fig.* 8.) to depreſs or couch the opake cryſtalline Lens. But it is much eaſier to write of the Advantage of uſing two Needles, than to experience it in Practice. But which ever Sort you chuſe, Care muſt be taken, that it be firſt well poliſhed with Cloth or Leather, before you uſe it to the Eye; that neither its Roughneſs, nor any Particles of Ruſt, may injure that very tender Organ. Mr. FREYTAGE beforementioned greatly recommends a Needle ſhaped like a Hook, for extracting membranous Cataracts out of the Eye: But if this ſucceeds ſo well, why did he not give us the Figure of it?

Apparatus of Dreſſings deſcribed.

XVII. That there may be no Obſtruction, nor any Time loſt in the Operation, it will be neceſſary to provide every thing in Order which may be wanted for the Dreſſings, after the Couching is performed. Such as, 1. a cooling Collyrium *ex Aq. Plantag. cum Ovi alb. ſubact. & cum Aluminis, vel Tutiæ, vel Croci, aut Camphoræ portiuncula.* Others uſe common *Sp. Vini* for a Collyrium. ST. YVES uſes a Mixture of ten Parts Water, and one *Sp. Vini*, which he recommends as the beſt. 2. A large Compreſs of ſoft Linen, ſufficient to cover the diſeaſed Eye. 3. A Bandage of about three Ells long, and two Fingers broad; or elſe an Handkerchief folded together in Form of a Triangle, to retain the Compreſs and Dreſſings on the Eye. Laſtly, 4. you muſt provide ſome *Aq. Reg. Hungar. vel Acetum, vel Sp. Cl. &c.* to rub the Patient's Noſtrils, if he ſhould faint in, or ſoon after the Operation.

[a] Such a Caſe as this is deſcribed by my Son, in his Account of the Operation for a Cataract, performed by TAYLOR at *Amſterdam*, in 1735, upon one of our Friends.

Position of the Patient.

XVIII. There now remains but one more Pre-requiſite before the Surgeon enters on his Work: And that is, to fix and ſecure the Patient in the moſt convenient and advantageous Poſture. He therefore muſt be placed againſt the Light on a much lower Seat than that of the Operator, as you may ſee in *Tab.* XVII. *Fig.* 1. E. the Surgeon himſelf C, being ſeated on a much higher Chair D. If the Patient can ſee either perfectly, or but in Part with the Eye, which is not couched, it muſt be firſt covered or blindfolded with a Handkerchief or Bandage; leſt, by ſeeing the Inſtrument approach, he ſhould move his Eye, and diſturb the Operation. Upon which Account it may be alſo proper to admoniſh the Patient, that if his Eye ſhould recover its Sight very ſuddenly in the Operation, as is not unfrequent, he may not ſtir, or make any Exclamations of Joy till it is over: Leſt, by a ſmall irregular Motion, the whole Cure ſhould be fruſtrated, and his Sight loſt for ever. The Patient ſhould fix his Hands on the Surgeon's Thighs, and his Legs alſo betwixt thoſe of the Operator. Sometimes it may be proper for an Aſſiſtant to hold up his Feet, that he may not riſe out of the Chair before the Operation is finiſhed. Behind the Patient muſt ſtand the Aſſiſtant A, ſecuring the Head, when the left Eye is to be couched, with his Left Hand on the Forehead, and his Right Hand upon the Chin, which he muſt preſs cloſe to his Breaſt, ſo as to hold the Head firm and ſteddy; becauſe a very ſmall Motion of the Head may cauſe perpetual Blindneſs, as we are aſſured by ſad Experience.

Method of Operating.

XIX. Every thing being thus prepared in Readineſs, the Patient is ordered to open his Eye-lids as wide as poſſible, and to turn his Eye inwards towards his Noſe, that a ſufficient Portion of the White of the Eye may appear in the leſſer Angle of the Orbet towards the Temple. (See *Plate* XVII. *Fig.* 14. A.) The Operator now divaricates the Eye-lids with the Fore-finger and Thumb of his left Hand, when it is the left Eye, and of his Right Hand when it is the right Eye he couches: And thus he at the ſame time firmly ſecures the Eye from moving: See *Fig.* 1, and *Fig.* 14. Some there are who uſe the *Speculum Oculi*, *Fig.* 15 or 16, for this Purpoſe, which, in my Opinion, will more impede than aſſiſt the Operator: But I ſhall not adviſe thoſe to reject it, who are fond of uſing it. The Oculiſt next takes the couching Needle, handed to him by an Aſſiſtant, betwixt the Thumb, Fore and Middle-finger of his Right Hand, in the Manner we uſually hold a Pen in Writing, as you may ſee in *Fig.* 1. and *Fig.* 14. He then places the two lower Fingers of the ſame Hand upon the Patient's Cheek, to ſupport thoſe which guide the Needle, and that they move freely, as in Writing. Then he carefully enters the Needle almoſt in the Middle of the White of the Eye[a] betwixt the *Cornea* and external Angle of the Orbit; proceeding, not obliquely, but ſtraight, through the Coats of the Eye, over-againſt the Cataract, to avoid wounding the Blood-veſſels; ſee *Fig.* 14. A. As ſoon as the Needle is perceived to be through the Coats of the Eye, which may be known by your looſing the Reſiſtance, its Point is then inclined towards the Cataract; (ſee *Fig.* 14. B.) which being entered by the End of your Inſtrument, you thereby endeavour to depreſs it gently below the Pupil to the Fundus of

[a] The true Place for perforating the Coats of the Eye by the couching Needle, has been largely and elegantly treated of in *Mem. Acad. Reg. Pariſ. An.* 1726, pag. 370. *Edit. Amſtel.* by M. PETIT, who aſſigns the Place to be two Lines Diſtance from the *Cornea*. The Place approved of by TAYLOR we ſhall conſider hereafter.

the Eye, whether it be a Membrane or an Opacity in the cryſtalline Lens: For we are not as yet furniſhed with diſtinguiſhing Marks ſufficient to know one Caſe from the other by their external Appearance, except the Obſervations of ST. YVES. If you perceive the Cataract deſcend with the Point of the Inſtrument below the Pupilla, which it will do the firſt Time, when mature and conſiſtent enough, you are then to continue it there a little while, that it may afterwards ſtay at the Fundus of the Eye. If, upon elevating your Inſtrument again, the Cataract does not riſe above the Pupil, your Operation is well performed: And therefore the Needle is now to be drawn out of the Eye in a ſtraight Line as it entered. If the Cataract riſes again afterwards above the Pupil, as it frequently does, you muſt again couch it with the ſame Needle, as before, keep it down a longer Time, till it remains ſuppreſſed below the Pupil. M. FREYTAGE indeed adviſes to extract the Cataract, which he thinks is always a Pellicle, by a Hook through the *Cornea:* As, he ſays, he has frequently ſeen done by his Father. But as he neither deſcribes the Hook, nor the Method of Extraction, and as I much doubt whether this Hook would not alſo extract or lacerate the *Retina*, *Choroides* and *Sclerotica*, 'tis, in my Opinion, beſt to neglect his Advice.

XX. When the Cataract adheres firmly to any of the Coats of the Eye, 'tis often a very difficult Taſk to couch or depreſs it entire: And therefore in this Caſe you may firſt divide it with the Needle, and then couch or depreſs each Part ſeparately. The ſame muſt be done if you happen to lacerate, or break the Cataract in Pieces in the Operation: And, by this means, the Patient has often recovered his Sight, as we read in CELSUS, GUILLEMEAU, PAREY, BARBET, BRISSAC, and as I have twice obſerved myſelf. If the Cataract adheres ſo firmly to the Uvea, that it can hardly be thence ſeparated, it is often convenient to perforate it in the Middle: By which Means the Rays of Light, paſſing through the Perforation to the *Retina*, the Patient can ſometimes ſee tolerably well afterwards. Which Practice may perhaps ſucceed beſt when the Cryſtalline is very thin: For I once found it ſo diminiſhed in Thickneſs in a dead Subject, that it was ſcarce thicker than one's Thumb-nail, and firmly adhered at the ſame Time to the Uvea. But when the Cataract appears to be yet too ſoft, it is adviſeable with BRISSAC, to withdraw the Needle, and defer the Operation till it becomes more conſiſtent, rather than deſtroy the Patient's Sight by confuſing the Humours. When both Eyes are to be couched, 'tis beſt not to perform the Operation on both at one Time, but to intermit a few Days, that the Patient may the better endure the ſame without too violent Symptoms. If you couch the right Eye, the Operation muſt be reverſed: That is, you muſt hold open the Eye-lids with the Thumb and Fingers of your Right Hand, and couch the Cataract by the Needle with thoſe of your Left; becauſe the Vicinity of the Noſe to the greater Canthus of the right Eye, will impede the Action of the right Hand for this Operation. Though in *Tab.* XVII. *Fig.* 17. you have the Figure of a Needle contrived and ſent me by a Friend, with which you may couch the right Eye with the Right Hand. A the Needle, B the Handle, C the Incurvation which reſts on the Noſe.

Reflections on the Operation.

XXI. It is a common Practice with Mountebanks and itinerant Oculiſts, to hold up their two Fingers extended, or elſe a Glaſs of Wine, before the Patient's Eye, as ſoon as the couching Needle is extracted; calling out to know

Treatment after the Operation.

what the Object is, or of what Colour it appears: And if the Patient can distinguish, and answer rightly, they then conclude the Operation to have been well performed. But this is, by the more prudent Surgeons and Oculists, judged to be a pernicious Method; because, by the Patient's straining his Eye too soon to view the Objects, the Cataract is often roused and elevated again. It is therefore much better to defend the Eye immediately after Couching with a Compress dipt in some Collyrium, and secured by a Handkerchief, that the *Retina* may not be injured by a too strong Action of the Light. It will be necessary to blind up both the Eyes, though you couched but one: Because if you leave the sound Eye uncovered, it will be perhaps looking at Objects, and will consequently draw or strain the diseased Eye in the same Direction; which may remove the Cataract, and cause it to ascend again, or else induce an Inflammation, or other bad Accidents.

How to prevent the Cataract from rising.

XXII. After your Dressing and Deligation, the Patient should be laid on his Bed, upon his Back, with his Head elevated, and retained almost erect, by Pillows; and continue very quiet and composed for the Space of eight Days, without coughing, sneezing, laughing, intense talking, or eating Food of a hard Digestion, in order to prevent the Cataract from rising or being disturbed. No Surgeon can assert that the Cataract shall continue suppressed after the first Time of couching: But the Patient has this Advantage, that if it ascends it may be again suppressed, and his Sight recovered by the Operation. Accordingly MAITRE-JEAN writes, that a Patient, whom he couched in Autumn, had a Return of his Cataract in the Spring following. But it was happily removed again by repeating the Operation. We have even some Instances of the Cataracts having subsided again of themselves, after they had risen above the Pupil.

Further Treatment.

XXIII. A few Hours after the Operation, it will be convenient to bleed the Patient in Proportion to his Strength and Fulness of Habit, to prevent an Inflammation in the wounded Eye; and to repeat the same, if necessary, with the Use of *Collyria* externally, and cooling Purges internally. 'Tis very remarkable, that the Patient is often troubled with a Vomiting an Hour or two after the Operation, as I have frequently observed, and imagine to arise from the Consent of the Nerves, and their Irritation in the Operation, which soon goes off afterwards: Which I find has been also observed by Mr. FREYTAGE. However, this Symptom of Vomiting is no good Presage, because the Patient's straining in this Action, often causes the Cataract to ascend. In the Evening, after the Operation, you should order the Patient an anodyne Emulsion, to compose him to Rest; because Watchings and Restlessness very often occasion the Cataract to ascend again above the Pupil. The Diet and Regimen here must be ordered the same as we have directed in Wounds and inflammatory Disorders. Lastly, if the Patient does not go to Stool freely without straining, it will be proper to help him with a Clyster: Nor should he be permitted to disturb his Head by rising out of Bed for this Office; but, for the first few Days after the Operation, it will be more convenient to use a Bed-pan. All which Precautions are necessary, to prevent the lately depressed Cataract from being disturbed or raised again above the Pupil.

XXIV. With regard to the Deligation and subsequent Dressings, it will be convenient to remove the Bandage very gently on the first Evening after the Operation;

Operation; and renewing the Compreſs dipt in ſome Collyrium, to apply the Bandage again as before. On the following Days this Proceſs muſt be repeated Morning and Evening at leaſt, and ſometimes four or five Times in a Day: Becauſe the Inflammation then becomes more intenſe, and the Compreſſes dry much ſooner. Therefore the Operator ſhould, at this Time, be more ſollicitous to guard the Light from the Eye, eſpecially when the Inflammation runs high. If the Eye continues in a good Condition with but a ſlight Inflammation, you muſt continue this Method of Dreſſing till the eighth Day, when all the Danger will be over: You may then, by Degrees, remove the Bandage, and admit the Light to the Eye, which ſhould be for ſome Time guarded at firſt with a Piece of green Silk hanging over the Forehead. On the tenth Day, if nothing forbids, the Patient may riſe and walk about his Chamber, provided his Window-curtains are drawn, and his Eyes defended with green Silk as before: Which he may, by Degrees, lay aſide, and return to his former Courſe of Life.

The Removal of Accidents.

XXV. That the young Surgeon may the better underſtand how to relieve the ſeveral Accidents which may attend this Operation, we ſhall conſider each of them ſeparately. And, 1. If a ſmall Portion of Blood ſhould be extravaſated, and eſcape into the aqueous Humour, ſo as to render it in ſome Meaſure obſcure and turbid, you muſt diſpatch the Operation as faſt as poſſible, and dreſs up the Eye with a Compreſs dipt in the forementioned Collyrium: By which Means ſlight Extravaſations have been frequently obſerved to be diſperſed. But if a large Quantity of Blood mixed with the aqueous Humour, it will then be almoſt impoſſible to avoid a Suppuration, termed *Hypopyum*, or other ill Conſequences, which endanger perpetual Blindneſs, or a total Deſtruction of the Eye. Yet even here you will find great Benefit from plentiful Bleeding, and from diſcutient Bags ſtuffed with Fennel, Sage, Hyſſop, and Roſemary, boiled in Wine, frequently to be applied warm to the Eye. 2. If the aqueous Humour itſelf eſcapes, or runs out of the Eye, in the Operation, ſo as to leave the *Cornea* flaccid, the Eye itſelf is not in any great Danger thereby: For the Humour will be reproduced ſo as to fill the *Cornea* again in a few Days. Laſtly, 3. If great Inflammation ſhould ariſe, you muſt omit nothing that will conduce to ſuppreſs it: As plentiful Bleeding, and drinking of Water, or other cooling and diluent Liquors, to bathe the Temples frequently with *Sp. Vini Camph.* to apply Bliſters behind the Ears, and clyſter the Patient as you ſhall ſee neceſſary.

Fabric of the couching Needle.

XXVI. From what has been ſaid, I think it is ſufficiently apparent how much the Moderns are improved above the Antients, as to their Knowledge of the true Nature or Diagnoſis, Prognoſis, and Method of curing this Diſorder. For, upon obſerving that a Cataract was rather conſtantly formed by an Opacity of the Cryſtalline, than from any Membrane, BRISSAC conſequently judged, that thoſe couching Needles would ſucceed beſt, which were made with a ſulcated and pretty broad Point, as in *Tab.* XVII. *Fig.* 6. *lit.* C. For by uſing thoſe ſlender-pointed Needles of the antient Surgeons, whether made of Gold, Silver, or Steel, it was almoſt impoſſible to avoid cutting or lacerating the Cataract in couching it. But the couching Needle of BRISSAC is made with an acuminated, as well as a broad and ſulcated Point, that it might the more readily perforate the Coats of the Eye. The Handle of the couching Needle

Needle A B is octangular; and the Side marked E E lying even with the Sulcus in its Point, is hatched, or otherwiſe particularly marked, that you may judge by the Poſition of the Handle how the Point of the Needle is directed, in reſpect of the Cataract in the Eye. Laſtly, the riſing or Protuberance of the Inſtrument, marked D, ſerves to indicate how deep it has entered into the Eye.

Other particular Needles.

XXVII. Thoſe Surgeons who have perſuaded themſelves, that a Cataract proceeds from a Membrane or Tunic, have alſo provided themſelves with an unciform Inſtrument, to extract the ſaid Membrane through the Puncture made in the Coats of the Eye by the Needle, and prevent the Diſorder from returning; as it might, if they were to leave the Cataract at the Bottom of the Eye. Some of their Inſtruments were made tubular, in order to ſuck out the Membrane from the Eye [a]; others were made like a Pair of ſmall Pliers in the Shape of a Needle; as in *Tab.* XVII. *Fig.* 10. and others again were like ſmall Hooks which they introduced and extracted through a Canula, together with the Tunic or Cataract, according to FREYTAGE. But their Methods and Inſtruments were as uſeleſs and miſchievous as their Notion of the Diſorder was falſe.

When the Cataract comes thro' the Pupil.

XXVIII. We have further to adviſe, that if the Cataract ſhould further extend itſelf, or ſlip through the Pupil, as it ſometimes may, it will then be proper to try if you can draw it back by paſſing the Needle through the Pupil; if not, to make a ſmall Inciſion in the lower Part of the *Cornea*, and thereby extract the Cataract by a ſmall Hook or Probe; an Inſtance of which Practice we have given in our profeſſed Treatiſe on this Diſorder.

TAYLOR's Method.

XXIX. The noted Oculiſt, TAYLOR, propoſes a new Method of his own, as he ſays, for couching Cataracts, in the ninth Chapter of his Treatiſe, which he deſcribes as follows: The Patient being ſeated as uſual, and his Eye held firm by the *Speculum Oculi*, he then makes a ſmall longitudinal Inciſion with a Lancet [b] of about half a Line in Length below the uſual Place; which Inciſion he continues through the external and internal Coats of the Eye into the vitreous Humour. He then takes a *Plano-convex* Needle of a very ſlender or thin make, and paſſes it through the Inciſion directly into the Eye, with its convex Part upwards and towards the Bottom of the cryſtalline Lens. He next gently elevates the Point of his Needle a little, till he finds a ſmall Reſiſtance on it from the cryſtalline Lens above it, which he alſo perceives to move, by looking through the Pupil. Being thus aſſured the Point of his Needle is under the Capſule of the Cryſtalline, he then guides his Needle downward towards the Bottom of the Eye, to divide the vitreous Humour, and make a Space for receiving the Cryſtalline, which he next depreſſes. In order to couch the Cryſtalline, after having divided the vitreous Humour, he draws his Needle about two Lines further out of the Eye, and then inſerts the Point of it into the lower Part of the Capſule of the Cryſtalline, which he thus incides or opens as he ſays, without injuring the *Ligamentum ciliare*: And in thus opening the Capſule, he alſo endeavours to enlarge the Space for receiving the Cryſtalline. Laſtly, in order to couch or depreſs the opake Cryſtalline, he again extracts his Needle almoſt three

[a] Vid. SCHACCHI *Subſid. Medicin.* p. 54. & TH. FIENI, *Lib. Chirurg.* p. 30.

[b] He does not give us any Reaſon for uſing a Lancet, or for making his Inciſion longitudinal rather than oblique or tranſverſe, nor can I ſee any Reaſon for it; but it is a ſtanding Maxim in Surgery, never to uſe ſeveral Inſtruments for what may be done as well by one.

Lines

Lines more out of the Eye: Then elevating its Point, and fixing the ſame into the upper Part of the Cryſtalline, he endeavours to depreſs and lodge it in the Space before made for its Reception in the vitreous Humour at the Fundus of the Eye, and then gently extracts his Needle. By this means, he aſſerts, that the *Uvea* and *Ligamentum ciliare* are not in the leaſt injured, but remain in their natural and ſound State: Whereas in the common Method of couching they are uſually lacerated, to the great Detriment of the Eye, and its Office of Viſion. To conclude, the Subſtance of his Method of operating, which we have here briefly related, is ſo ſwelled and obſcured, by ſtuffing it with frivoulous Cautions and Circumſtances, in his Treatiſe, from whence we have extracted it, that it there takes up more than three Times the Compaſs in which we have here repreſented it: And yet we have omitted nothing but what was either inſignificant or unintelligible. There are even ſo many Circumſtances related, that it ſeems impoſſible the Author himſelf ſhould attend to all of them; and this may poſſibly be one Reaſon of his ill Succeſs in Practice, his Operation being followed with excruciating Pains, moſt violent Inflammation, and a Suppuration of the Eye, inſtead of recovering the Patient's Sight: As you may ſee related more at large in my Son's Treatiſe, on the unhappy couching of a Cataract in our Friend at *Amſterdam*, by TAYLOR, in 1735. However, the Practice deſerves to be conſidered and tried by the more prudent Oculiſts: And the Succeſs of it will, in Time, determine the Author's Merit.

His Treatment of the ſhaking Cataract.

XXX. When the Cataract moves, or when the opake cryſtalline Lens is ſlipt out of its Capſule, and fluctuates behind the Pupil, which TAYLOR then calls a *ſhaking Cataract*; the Diſorder, he ſays, will now require a different Method of Cure: To explain which he makes the Buſineſs of two diſtinct Chapters, which import no more than that he here paſſes his Needle as before, into the Eye, directing its Point to the upper and anterior Part of the Cataract, or opake Cryſtalline, to avoid injuring the ciliary Ligament; and then, with the plain Surface of his couching Needle, he depreſſes the ſame to the Bottom of the vitreous Humour.

His Treatment of the falſe Cataract and Glaucoma.

XXXI. In ſome Cataracts, which he terms *falſe*, he ſays, the Capſule of the Cryſtalline is vitiated, and become opake, as well as the Lens. The Method of couching both of which, and freeing them from the ciliary Ligament, is related by him in ſo prolix a Manner, that he again makes it the Buſineſs of two whole Chapters. Two other Chapters are again employed in explaining his Operation for the *Glaucoma:* By which Name he underſtands, contrary to all his Predeceſſors, an Opacity joined with an Expanſion of the cryſtalline Lens, which, with its vitiated Capſule, are extended or protruded forwards cloſe to the Margin of the Pupil: For the Cure of which he proceeds in the ſame Manner as before. But I know not what Right or Authority he has, more than his own Aſſurance, to impoſe this Name to a Diſorder, different from what it has been all along intended to ſignify by our Predeceſſors. For it will appear quite unwarrantable even to make, and much more to transfer Names, without an abſolute Neceſſity. Since what he calls a *Glaucoma*, is, I think, a Species of the Cataract, and not a Diſorder of the vitreous Humour, ſeated much deeper in the Eye, as the Antients have all along underſtood by the Name.

His Extraction of Cataracts thro' the Cornea.

XXXII. We before obſerved, at *N.* XXVIII. that thoſe Cataracts which have eſcaped through the Pupil, may be extracted by an Inciſion made in the *Cornea*. But I have been aſſured from *England*, that this famous Oculiſt there boaſted, that

that he could, and does extract Cataracts in this Manner, which are even fixed behind the Pupil and *Uvea*. But I could never yet learn the Truth of his Assertion, or that he ever performed the Fact.

CHAP. LVI.

Of Dilating CONTRACTIONS *of the* PUPIL.

Description of the Disorder.

I. WE are now to treat of an Operation related to the foregoing, in which the Coats of the Eye are perforated by an Instrument, almost in the same Manner as in couching a Cataract, in order to open an imperforated or contracted Pupil. The Disease we are now speaking of is therefore such a total or close Contraction of the Pupil, that it will not transmit Light enough to the Bottom of the Eye, to enable the Patient to see Objects distinctly. Sometimes this Disorder has grown up from Infancy; and sometimes it arises from an intense Inflammation of the Eye, or some sudden and violent Constriction of the Pupil from other Causes, with a Palsy of the strait Fibres in the *Uvea*; or when the internal Margin of that Membrane, which constitutes the Pupil, is concreted or joined to a Cataract, or to some Part of a Cataract, after the Operation. The Cure of the Disorder is generally esteemed extremely difficult, if not altogether impracticable. But the celebrated Mr. CHESELDEN has contrived a new Method of relieving this Disorder, which he has not only tried several Times with Success, but also described his Process in the *Philosophical Transactions*, and in the *Appendix* to the fourth Edition of his Anatomy: Which we shall therefore give a Place here in our Surgery, as follows:

The Operation.

II. The Eye-lids being held open by a *Speculum Oculi*, he then takes a narrow and single-edged Scalpel, or Needle, *Tab.* XVII. *Fig.* 19. AA, almost like that for couching a Cataract; and passing it through the *Sclerotica* B, as in couching, he afterwards thrusts it forwards through the *Uvea* or *Iris*, and, in extracting it, cuts through the *Iris* in the Manner represented by *Fig.* 20. A. If the Disorder is not accompanied with a Cataract, it will be best to perforate the *Iris* in the Middle, as you may perceive by *Fig.* 20. But when there is a Cataract, the Incision should be made a little higher in the *Uvea*, that the Cataract may not obstruct the Ingress of the Rays of Light. The Cataracts which sometimes accompany this Disorder, he says, are generally very small; and sometimes their Adhesion to the *Iris* is so firm, as to render it impracticable to couch or suppress them. In *Fig.* 21. the Incision or Aperture is represented lower than the Centre of the *Cornea* and *Uvea*; because in this Eye on which he performed the Operation there was an *Albugo*, or white Speck, upon the upper Part of the *Cornea*, which obliged him to incise lower than usual. He does not indeed relate the Manner of treating the Patient afterwards, to suppress and guard against an Inflammation, and other Accidents: But 'tis reasonable to suppose you must proceed in the same Method as after the Operation for a Cataract.

An EXPLANATION *of the* SEVENTEENTH PLATE.

Fig. 1. Demonstrates the Position of the Patient, Surgeon, and Assistant, proper for couching a Cataract as explained in *Chap.* LV. *N.* XVIII.

Fig. 2, 3. Represents the Silver couching Needles used by the Antients; the first having a slender and round Point like common Needles, and the last a triangular Point.

Fig. 4.

Fig. 2.

Fig. 3.

Fig. 4.

A

C

B

Fig. 5.

Fig. 6.

C

D

B

E

Fig. 7

Fig. 8.

Fig. 9.

Fig. 10.

Fig. 11.

A

C

B

Fig. 12.

A

B

A

Fig. 13.

C

D

E

B

Fig. 14.

B A

Fig. 17.

B

C

Fig. 18.

Fig. 16.

A A

B

B

Fig. 1.

C

B

D

Fig. 20.

A

Fig. 21.

A

Fig. 15.

Fig. 19.

A A

B

Fig. 4. Repreſents a double-pointed couching Needle; that marked A being round and ſlender, and that at B a little broader or flatter: C denotes the Handle, which may be made of Silver, Braſs, Ivory, or Wood.

Fig. 5. Is another Needle with a ſtill broader Point, but ſharp-edged; with which a Cataract may be more commodiouſly held and couched than by a ſmaller Point.

Fig. 6. Denotes another couching Needle, almoſt like the former, only furniſhed with a *Sulcus* in its *Apex*, which is recommended by BRISSAC, and deſcribed more largely at N° XXVI. of *Chap.* LV.

Fig. 7, 8. Repreſent two Needles from SOLINGEN and NUCKE, which are ſaid to be invented by the *Dutch* Oculiſt SALMASIUS, and to be both uſed in one and the ſame Operation. That at *Fig.* 7. is ſulcated and ſharp-pointed, almoſt like the preceding, and ſerves to perforate the Coats of the Eye; from whence BRISSAC ſeems to have taken his at *Fig.* 6. But that at *Fig.* 8. is obtuſe, and made ſo as to paſs through the *Sulcus* of the preceding Needle, while it continues in the Eye to depreſs the Cataract.

Fig. 9, and 10. Repreſent two Needles of pretty much the ſame Uſe with the two preceding, and are taken from BERN. ALBINUS's *Diſputatio de Cataracta, Francof. impreſſ.*

Fig. 11. Denotes the Needle propoſed by ALBINUS, in his ſaid Treatiſe, for extracting a membranous Cataract out of the Eye; being ſo contrived that the Point A opens like a Pair of Pliers, to extract the membranous Cataract, (if there be any in the Eye) by depreſſing the little Handle B; though I much doubt whether it was ever uſed with Succeſs.

Fig. 12, and 13. Repreſent the Parts of the preceding Needle ſeparate and aſunder. *Fig.* 12. is the ſulcated Point, in which is lodged the other Point *Fig.* 13. Theſe perforate the Eye the better, as they are more exactly fitted and poliſhed. They are connected by the Hinge B, C, D. *Fig.* 11, 12, and 13. E. *Fig.* 13. denotes a Spring to preſs the two Points cloſe together, till you open them by depreſſing it with your Thumb on the little Handle, B. *Fig.* 11. to apprehend and extract the Membrane.

Fig. 14. Repreſents the Method of holding open the Eye-lids with one Hand, and of paſſing the Needle with your other, for couching a Cataract, the Point B uſually appearing through the Pupil.

Fig. 15, and 16. Repreſent two *Specula Oculorum*, to hold the Eyes firm, and open their Lids in couching, and other Operations for the Eyes: The laſt is more correct than the firſt, as you may extend or contract the Circle AA, BB, by elevating or depreſſing the Button C. The Handle is denoted by D.

Fig. 17. Repreſents a Needle for couching a Cataract in the right Eye with the Right Hand. A the Point of the Needle; B its Handle, in which is a particular Kind of Incurvation, C to reſt upon the Noſe.

Fig. 18. Is a Cap or Sheath for including the Point of the ſaid Needle.

Fig. 19. Is taken from the *Appendix* to the fourth Edition of Mr. CHESELDEN's *Anatomy*, to ſhew the Manner of directing his Cutting-needle to open or inciſe the cloſed or contracted *Uvea*.

Fig. 20. Denotes the Manner of dividing the *Uvea* in its Middle by the ſame Inſtrument, to tranſmit the Rays of Light into the Eye.

Fig. 21. Repreſents the Manner in which Mr. CHESELDEN pierced the *Uvea* lower than uſual, on the Account of an *Albugo*, which infeſted the Middle of the *Cornea* in this Eye.

CHAP. LVII.

Of the PTERYGIUM, *or* Unguis Oculorum.

Deſcription. I. WHEN a preternatural Membrane is formed externally upon the Coats of the Eye, ſo as to extend itſelf over the *Cornea* and Pupil, and obſtruct the Sight, the Diſorder is then uſually denominated *Onyx* by the *Greeks*, and *Unguis*, or *Ungula*, by the *Latins*; it is alſo ſometimes named *Pterygium*, from its Reſemblance to the Wing of a Bat[a]. Sometimes the Pellicle or Film appears red, from the Number of the ſmall Blood-veſſels, and then it is uſually denominated *Pannus*. It moſt frequently ariſes in the Angles of the Eyes from the Temples or Noſe, and ſometimes from above or below, extending itſelf, by Degrees, over the *Cornea*, (as in *Tab.* XVIII. *Fig.* 1 and 2. *a a.*) Sometimes it only adheres ſlightly to the *Cornea* by a few ſlender Fibres; and ſometimes again it is extended over the whole Eye, and continues moſt firmly and intimately attached to it, which uſually renders the Caſe much more difficult to cure.

Cure by Medicines. II. While the Pellicle is but recent, and ſlightly attached, it may be removed by gentle Eſcharotics; ſuch as Powder *ex Saccar. Canarienſ.* ℥j. *Vitrioli albi vel Aluminis uſti, vel etiam viridis Æris Gr.* iv. *vel* vj. which muſt be carefully ſprinkled at Intervals by a little at a Time upon the Membrane. Some uſe a Powder of the *Lapis ſciſſilis*, or of the *Os Sepiæ* mixed with Sugar. But as it will be difficult to uſe ſuch a Powder for Infants, it will be better to treat them with an Eye-water, as that of QUERCITAN, *cum Vitriol. alb. aut felle Muſtelæ piſcis, &c.* which may be alſo uſed to Advantage for Adults. If the Diſorder is accompanied with an Inflammation, it will be convenient for you to treat the Patient accordingly, by Bleeding, Bliſters, and cooling Medicines. M. ST. YVES ſets a great Value on the *Lapis medicamentoſus Crollii*, diſſolved in Water, and uſed to waſh the Eye; though, in my Opinion, a Solution of *Vitriol. alb.* ʒſs. *in Aqua Chelidonii major.* ℥ij. is little inferior, if at all.

Cure by the Scalpel. III. If the mild Eſcharotics, before propoſed, are inſufficient for deſtroying the Pellicle, you muſt then extirpate it. In order to which, the Patient muſt kneel down on his left Knee, if the right Knee be affected, and lean his Head back againſt the Light upon the Surgeon's Lap, or Knees, who then takes the ſmall Hook, *Tab.* XVIII. *Fig.* 3. or *Tab.* XV. *Fig.* 30. and, after the Eye-lids are held open by an Aſſiſtant, endeavours to paſs its Point under the thickeſt or looſeſt Part of the Pellicle, to elevate it a little. In the next Place, he takes the Needle *a*, armed with a Thread, *Fig.* 1. *b b.* and paſſing it under the Pellicle, ties it with a double Knot: And then faſtening the two Ends in a Loop, *Fig.* 2. *b c.* he thereby attempts to make a gentle Elevation. This done, he now endeavours to ſeparate the upper and lower Margin of the Membrane

[a] CELSUS, *Lib.* VII. *Cap.* 7. N° IV. and CASTEL. *Lex. Med. per* BRUNO. *ſub tit.* ONYX.

with

with a Lancet, that he may afterwards cut off the reſt immediately in a ſtraight Line near the lacrymal Caruncle by a Pair of ſmall and ſtraight Sciſſors. He then draws back the Thread and Membrane towards the *Cornea*, and if it adheres any where to the Eye, frees it by Degrees with a Scalpel or Sciſſors: In doing which, the Operator muſt have a principal Regard to two Things: 1. To avoid injuring the *Cornea*; and, 2. To obſerve that no Part of the Membrane be left adhering to the Eye; which laſt might occaſion a Return of the Diſorder. Yet it is better to leave ſome Part of the *Unguis* adhering to the *Cornea*, when its Separation is extremely difficult, than to wound the *Cornea*, and leave irremediable Scars in it: And this the rather, becauſe any ſmall Portion of the Membrane left behind may be taken off afterwards, by treating the Eye two or three Times in a Day with the gentle Eſcharotics before propoſed at N° II. Though there are ſome, who rather approve of the following *Collyrium* for removing the membranous Reliques:

℞. *Aq. Roſar. Damaſcenar. Plantag. ana.* ℥j. *Matr. Perlar. pp*^{t} ℈j. *Sacchari Saturni Gr.* vj. *Vitrioli albi Gr.* iij. *M. f. Collyr.*

M. ST. YVES approves of waſhing the Eye for three or four Days afterwards with *Sp. Vini* diluted with Water, and then to uſe a Solution of the *Lapis medicamentoſus* in Spring-water. Laſtly, in extirpating the Pellicle, great Care muſt be taken not to cut off any Part of the lacrymal Caruncle, and much more not to remove the whole of it: For, if this Body be wanting in the greater *Canthus* of the Eye, where it ſtops and directs the Tears into the *Puncta lacrymalia*, the Patient will conſequently be troubled with a watery Eye, in which the lacrymal Humour will run down over his Cheek.

IV. Some of theſe Pellicles which appear red, from the ſmall Blood-veſſels extended to them from the Corners of the Eyes, will wither or eaſily fall off with the Uſe of Medicines, upon ſcarifying and dividing thoſe Veſſels in the *Canthus* of the Eye which feed and nouriſh them. Sometimes the *Cornea* is incruſted over with a glutinous Matter, like Fat or a Membrane, which may be readily ſcowred off with the Gall of an Eel, Lamprey, or the Bile of ſome other Animal. This was probably the Caſe of TOBIAS, mentioned in the *Old Teſtament*. Sometimes indeed we meet with Membranes of this Nature, which are inſeparable from the *Cornea* by any means whatever. But this we cannot be aſſured of before Trial: And we ought rather to try the Operation in vain, than to relinquiſh the Diſorder, unjuſtly, as incurable. Laſtly, ſome Pellicles upon the Eye are extremely painful and ſtubborn, inclining to a cancerous Diſpoſition: And theſe it may be beſt for the Surgeon to relinquiſh as incurable. Other Methods of Cure.

V. When the *Pterygium* or *Unguis* is extended over the whole Eye, it will be convenient to divide it by a cruciform Inciſion into four Parts, according to M. ST. YVES, and then to ſeparate each of them from the *Cornea* and Eye; (as we before directed for the *Unguis* in general) conducting the remainder of your Dreſſing as we there preſcribed. Pterygium of the whole Eye.

VI. Laſtly, when this Operation is to be performed upon the left Eye, the Patient ſhould riſe up from the Ground as ſoon as the Needle has been paſſed through the Membrane, and the Threads tied: For, being placed in a Chair, the Opera-

tor may have a better Command of the Eye than before; except he ſhould happen to be as active with his Left Hand as with his Right. If the Membrane appears to be thin and weak, Care ſhould be taken not to extend it too forcibly by the Thread, leſt it ſhould break.

CHAP. LVIII.

Of the Albugo, Leucoma, Nebula, Nubecula, *and other* Spots *in the* Cornea *of the* Eye.

Deſcription. I. AS in ſeveral other Claſſes of Diſorders belonging to the Eye, ſo in this we meet with a great deal of Confuſion, by a Miſapplication and Reduplication of ſeveral Names, which are often uſed to import the ſame Diſeaſe; whence ariſe Difficulties and Miſtakes to the Learner, and Errors in the Method of Cure. However, we find that the moſt eminent Surgeons and Phyſicians intend, by theſe Names, or Sort of whitiſh Spots in the *Cornea*; though they appear not always alike, and of the ſame Kind, being ſometimes larger or ſmaller, thicker or thinner, or more or leſs protuberant. According to their different State and Condition they more or leſs obſcure the Sight, and ſometimes wholly intercept it. Hence we have alſo a Reaſon why the blemiſh was ſometimes called *Leucoma* by the *Greeks*, and *Albugo* by the *Latins*, or *Nebula* and *Nubecula*; according as it appeared darker or clearer.

Cauſes. II. The Cauſes of theſe Blemiſhes are various. For they may ariſe, 1. from an Obſtruction of the pellucid Veſſels in the *Tunica cornea*, and an Inſpiſſation of their contained Juices, proceeding from a violent Inflammation of the Eye: Or, 2. from a Suppuration, and then an Induration of theſe Juices in the *Cornea* after an Inflammation, ſo that it, by Degrees, becomes more opake, as it hardens, and puts on a whitiſh Hue, being ſometimes miſtaken for an *Unguis*[a]. 3. Theſe Spots may ariſe from an external Eroſion or Ulcer in the *Cornea*; or, 4. from Puſtules or *Veſiculæ* in various inflammatory Diſorders; particularly, 5. from thoſe which are occaſioned by the Small-Pox. 6. They may very often proceed from the Scars left after a Puncture in the *Cornea*, from a Sword, Knife, Fork, a Splinter, Glaſs, a Thorn, or the like. Or, 7. from a Burn; or, 8. the corroding Acrimony of cauſtic Subſtances falling into the Eye. Laſtly, 9. they may ſometimes be formed of a pecular Tunic growing to the Eye itſelf.

Prognoſis. III. Theſe Diſorders of the *Cornea* are ſome more and ſome leſs difficult to remove, according to their Duration, and the particular Cauſes from whence they proceed, with the Patient's Age, and other Circumſtances. Infants may be more eaſily freed from them than Adults, when they are not of any long ſtanding. But for thoſe which are Scars formed from Wounds, Burns, Punctures, or the like, there is little or no Hope of removing them.

Methods of Cure. IV. If any one is deſirous to be ſucceſsful in removing theſe Spots, he muſt adapt his Method of Cure to the Cauſe of the Diſorder. For thoſe which ariſe

[a] See *Chap.* LVII. and LX. Likewiſe Mauchart's Treatiſe.

from

from inſpiſſated Humours betwixt the *Laminæ* of the *Cornea*, and are not of long ſtanding, may be beſt removed by a proper Regimen, attenuating Diet, and Medicines, eſpecially a plentiful Uſe of thoſe Decoctions and Infuſions which are ſudorific. But then at the ſame time muſt be uſed externally Phlebotomy, Scarification, Bliſters, and frequent waſhing of the Feet. Upon the Eye itſelf may be alſo applied diſcutient Bags *ex fol. Hyſſop. Rhriſmarin. flor. Chamom. Sem. fænic. &c.* boiled in Wine or Water, and frequently laid on the Eye; or a Collyrium *ex Aq. fænic. cum Sp. Vin. Camph.* Laſtly, it may be convenient for the Patient to hold his Eye ſometimes over the warm Vapours of Coffee, or a Decoction of the Woods. On the contrary, it will be here pernicious to uſe cold and aſtringent *Collyria*; eſpecially thoſe of white Vitriol, though they are much eſteemed: Whereas warm Applications are found by Experience to be of the greateſt Service. When the Inflammation is diſperſed, the Patient may wet his Eye every Day with ſome of the *Aqua Ophthalmica Quecitani, cum Tutia pp.* made warm before uſing it. If any of the ſmall Veins proceeding to the Spot appear turgid on the White of the Eye, it will be proper to divide them by the double-edged and crooked Needle (*Tab.* I. *Fig.* 5. or *Tab.* XVI. *Fig.* 2.) a Lancet or Sciſſors. Laſtly, in ſome of them which are of long ſtanding, you may rather expect any thing than their Cure.

Cure of Spots and Abſceſſes.

VI. In thoſe whitiſh Spots which proceed from Abſceſſes, or a Suppuration of Matter after an Inflammation betwixt the *Laminæ* of the *Cornea*, which they elevate like a Pea, or Pearl, (whence they are ſometimes called *Pearls*) you ſhould make an Inciſion into the *Cornea*, to diſcharge the included Matter; which might otherwiſe by Degrees erode the *Cornea*, and deſtroy the Sight. Your Inciſion for this Purpoſe may be made either by the Lancet, or by a couching Needle, *Tab.* XVII. through the *Cornea* quite to the Abſceſs; and repeated, if there be Occaſion: Treating the Eye afterwards with ſome of the diſcutient Medicines propoſed at N° V. Others uſe Vipers Fat, to cleanſe or heal the Puncture or Inciſion, and, by this Means, the Sight is ſometimes happily reſtored. But when the Matter is lodged deep, and not near the Outſide of the *Cornea*, it will be impoſſible to preſerve the Eye-ſight diſtinct and perfect, either by this, or any other Means.

Cure of an Albugo from an external Erosion of the Cornea.

VII. But when the *Cornea* is eroded externally, either from an Abſceſs, Inflammation, or any other Cauſe, the following Method is taken by M. St. Yves. Firſt, he removes the Inflammation, and then orders the Patient to waſh his Eye frequently with the *Aqua viridis ophthalmica Hartmanni*, which is made weaker or ſtronger, according as the Patient can bear it: The admirable Virtues of which Water for removing Spots in the *Cornea*, are ſtrongly recommended by the ſame Author.

Cure of thoſe from Burns, or the Small-pox.

VIII. In ſome of thoſe ardent or inflammatory Puſtules of the *Cornea*, which appear afterwards whitiſh and protuberant, like a Pearl or Grain of Millet, the beſt and moſt expeditious Method of removing them is, by perforating with a Needle, ſo as to diſcharge their contained Matter. And in thoſe Puſtules ariſing from the Small-Pox, you ought to make an Apertion by a Needle or Lancet, immediately to diſcharge the eroding Matter, removing the Pellicle afterwards with ſome *Alumen uſtum cum Saccar. cand. & Ovor. teſt. pp.* applied every Day to the *Cornea*. Others uſe Tinder, or burnt Lint dipt in Oil. By either of

which the remaining Film will, by Degrees, vaniſh, according to ST. YVES, (pag. 229.) The ſame Method of Cure muſt be taken for diſcharging the Matter in Puſtules formed in the *Cornea* from Burns; treating the Blemiſh afterwards with the Medicines we have directed in *Chap.* LVII. preceding.

Incurable Spots.

IX. Thoſe Spots of the *Cornea*, which ariſe from Wounds, Scars, or the Abuſe of the vitriolic *Collyria*, are ſeldom curable: As are thoſe alſo which render the *Cornea* quite opake, and are of very long ſtanding, or in which the natural Form of the Eye or *Cornea* are deſtroyed. In theſe Caſes it is therefore much better to leave the Patient to himſelf unmoleſted, than to torture his Eyes to no Purpoſe, by a tedious Courſe of Remedies and Operations.

CHAP. LIX.

Of the STAPHYLOMA.

A Staphyloma deſcribed.

I. UNDER the Term *Staphyloma*, (the *Grape*) are chiefly compriſed two Diſorders of the Eyes: One, in which the *Cornea* is more than uſually protuberant, as in *Tab.* XVIII. *Fig.* 4, 5, 6, 7 and 8: The other, in which the Pupil or *Uvea* breaks forth and forms an unſightly Tumor on the *Cornea*, either from internal Cauſes, or from ſome wounding Inſtrument forced through the Coat; in which laſt Caſe the Sight of the Eye is uſually deſtroyed. See *Fig.* 8. *a a.*

Kinds.

II. There are various Species and Denominations of the *Staphyloma*, according to their Size and Shape: As the *Margarita*, *Myocephalus*, *Clavus*, *Mylon*, *ſive Pomum*, and the *Staphyloma*, or *Acinus* ſtrictly ſo called; of all which the biggeſt is the *Mylon*. But I have ſometimes obſerved not only the *Cornea*, but alſo the *Sclerotica* preternaturally diſtended, and enlarged to a great Degree after the ſame Manner as a *Hernia ventralis*, or, the lacrymal Sack, and then the Diſorder may be alſo denominated *Staphyloma*, becauſe thoſe two Coats, the *Cornea* and *Sclerotica*, are properly conſtituted but of one. However, it may be juſt to diſtinguiſh thoſe Tumors from each other, according to the different Parts affected, by denominating one of them *Staphyloma Scleroticæ*, and the other *Staphyloma Corneæ*.

Prognoſis.

III. A *Staphyloma* is a dangerous Diſorder, as well becauſe it greatly deforms the Eye, and deſtroys its Sight, as becauſe it often induces moſt violent Inflammations, Head-achs, Reſtleſſneſs, Abſceſs, and ſometimes a Cancer in theſe Parts. The Cure of it is therefore generally undertaken, not ſo much to recover the Sight, as to preſerve or reſtore the Uniformity of the Eye, and prevent the malignant Symptoms before enumerated.

Cure of a recent Staphyloma.

IV. In the Cure of this Diſorder we muſt relieve the Tumor and Deformity of the *Sclerotica* and *Cornea*, by the Application of a Compreſs dipt in *Aqua aluminis*, together with a Plate of Lead and Bandage, or ſome proper compreſſing Inſtrument. If the *Uvea* protrudes itſelf through a Wound in the *Cornea*, it ſhould be returned by a Probe. The Patient in the mean time muſt lie in a

ſupine

ſupine Poſture, and the Wound be conſtantly dreſſed with the White of an Egg, or Mucilage of Quince-ſeeds, till it is healed: By which Means the Patient often recovers his Sight.

V. If the Diſorder is become inveterate, and inflexible to all Remedies, you muſt paſs a Needle with a double Thread through the Middle of the Tumor, as in *Fig.* 8. *Tab.* XVIII. Then the two Ends of the Thread are to be tied together in a Knot, firſt on one Side, and then on the other: By which Means the Tumor will gradually wither, and, at length, fall off together with the Threads. Cure of an inveterate Staphyloma.

VI. But as this Ligature frequently occaſions violent Pain, Inflammation, and ſometimes a Suppuration of the Eye; it would ſeem to be a more ſafe and expeditious Method to extirpate the Tumor by the Sciſſors or Scalpel. In this Manner I myſelf once cut off a Protuberance of this Kind at the Root, from the Eye, of the length of one's Finger, by a Pair of Sciſſors. Another Method.

VII. M. ST. YVES's Method of removing theſe Protuberances, (ſee his Treatiſe, p. 233.) when they have not wholly covered and obſcured the *Cornea*, is to paſs a crooked Needle and Thread of Silk through the Middle of the *Staphyloma:* After removing the Needle, he twiſts together the Thread, and extends them with his Left Hand; while, with a Scalpel or Lancet, he frees the Tumor under the Ligature, till he can, at length, totally extirpate it by the Sciſſors. Laſtly, he applies a Compreſs over the diſordered Eye, dipt in *Sp. Vini*, diluted with Water, as was obſerved in treating of the Cataract. And thus not only the *Staphyloma* is removed, but the *Cornea* itſelf becomes perfectly healed, or elſe leaves but a very ſmall Aperture in the Middle of the Wound: From whence indeed the aqueous Humour is continually diſcharged as faſt as it is ſecerned in the Eye, but without any Trouble or Uneaſineſs to the Patient; becauſe it flows gently with the Tears through the lacrymal Paſſages into the Noſe. The Method of M. ST. YVES.

VIII. When the whole *Cornea* is infeſted with a *Staphyloma*, as in *Fig.* 4, 5, 6, 7. the moſt expeditious Method of Cure is that of ST. YVES, by cutting out circularly not only the *Cornea*, but alſo the *Iris* or *Uvea*, all round within a Line of the Ring, by which it touches the *Albuginea:* After which, all the Humours of the Eye falling out, the remaining Coats contract themſelves into a ſmaller Compaſs, and the Wound itſelf will gradually heal up. You muſt then provide the Patient with an artificial Eye, adapted in Size, Shape, and Aſpect, to ſupply the Place of that which is wanting. In this Manner the artificial Eye may frequently be moved from one Side to the other by the remaining Muſcles of that Organ, ſo that many cannot diſcern it to be an artificial, but will take it for a true or natural Eye: And in this laſt Method I myſelf have cured the *Staphyloma.* A ſecond Method of ST. YVES.

CHAP.

CHAP. LX.

Of the HYPOPYON.

Deſcription. I. WE frequently meet with a Collection of purulent Matter immediately under the *Cornea*, in the Place of the aqueous Humour: Which Diſorder is generally denominated *Hypopyon* or *Pyoſis*[a]. The *Hypopyon* ariſes from an Extravaſation of Blood or Matter in this Part, which may happen after a violent Inflammation, the Small-Pox, couching a Cataract, or from other external Injuries of the Eyes from Violence, as Contuſion, from a Blow or Fall, a Burn, *&c.* It is at the Beginning very often attended with excruciating Pains both of the Head and Eyes: And, according to the Degree of Injury, is ſoon after followed either with Blindneſs and a Deſtruction of the Eye, or Death itſelf.

Cure. II. There are chiefly three Methods of treating this Diſorder. The firſt and mildeſt is by diſperſing the Matter with diſcutient Remedies; ſuch as the Application of Compreſſes dipt in a Decoction of Sage, Eye-bright, Hyſſop, and Fennel-ſeeds in Wine, or of little Bags ſtuffed with the ſame Ingredients, and boiled in Wine, which are to be frequently renewed: By which Means, when the Blood or Matter is in no great Quantity, the Eye recovers its former Integrity and Action, as I have frequently experienced. Therefore you ſhould continue the Patient in this Method ſo long as you find any Benefit from it, even till the corrupt Matter or Blood is all diſſipated or diſperſed. But, if the Pain and other Symptoms are rendered more intenſe by theſe Applications, you muſt proceed immediately to the Operation. Otherwiſe, there will be great Danger of the contained Matter's eroding the *Cornea*, and deſtroying the internal Parts of the Eye, which will induce Blindneſs after the moſt intenſe Pains.

Cure by agitating the Head. III. But before we treat of the Operation, it may be proper to deſcribe the Method of Cure, which, we read, was formerly uſed with Succeſs by JUSTUS, an eminent Oculiſt in the Time of GALEN, who himſelf was an Eye-witneſs of his Practice, as he writes in the End of his XIV^th^ Book *De Methodo Medendi.* In the firſt Place, he ſeated the Patient on a Sort of Chair over-againſt himſelf; then taking hold of his Head with both Hands, he ſhook it about very aſſiduouſly, till all the purulent Matter diſappeared: In which Operation it is very remarkable, that GALEN himſelf teſtifies, the Spectators could perceive the corrupt Matter gradually ſubſiding to the Bottom of the Eye. Moſt People will be apt to reject this Method, as uſeleſs and ridiculous: But my Opinion is, that it may be often very effectual in removing the *Hypopyon.* In this I am confirmed, not only by the Authority of GALEN, but alſo from my own Experience

[a] Indeed M. St YVES names this Diſorder of the Eyes *Onyx*; the *Hypopyon*, according to him, being a Suppuration in the *Tunica Cornea* itſelf: So that an *Onyx*, or *Unguis*, may ariſe from an *Hypopyon*, when the Matter of the laſt erodes into the *Cornea*, by deſtroying its internal *Camella*. See his Treatiſe *De Morb. Oculor.* Part II. Cap. 9. pag. 221, *& ſeq.* Hence we may ſee how much even ſome of our modern Surgeons and Oculiſts are at Variance in their aſcertaining the Diſorders of the Eyes and their Names.

in

in a Patient who, being juſt entered under my Care for an Hypopyon, was obliged to take a Journey in a Chariot; by the repeated ſhaking and jolting of which, upon his Return the next Day, I found all the purulent Matter diſperſed: And, without doubt, it was ſubſided or thrown down behind the Uvea. It may therefore not be improper to try this Practice before the chirurgical Operation by the Hand and Inſtruments. But before you ſhake the Head, it will be proper to diſpoſe it, or the Patient's whole Body, in a ſupine Poſture, and to preſs the Eye, firſt, with the Fingers, in order to looſen and remove the Matter. But, when the Diſorder is great and obſtinate, the purulent Matter being too copious, or too firmly fixed to be diſperſed in this Manner, Recourſe muſt then be had to the Operation long ago deſcribed and recommended by GALEN, ÆTIUS, and others of the Antients: Which has met with ſo much Neglect among our modern Surgeons and Oculiſts, that it would ſcarce have been known or heard of at preſent, if it had not been reſtored in the laſt Century by RIVERIUS, MEEKREN, NUCKE, and BIDLOW.

IV. Preparatory to the Operation, your Patient muſt be placed and ſeated againſt the Light, with his Head and Hands firmly ſecured each by an Aſſiſtant, as in couching a Cataract. Then the Surgeon himſelf depreſſes the lower Eyelid, while an Aſſiſtant elevates the upper. The Operator now takes a Lancet, and therewith cautiouſly incides through the *Cornea*, below the Pupil, and about the Space of a Line from the *Albuginea*, making his Apertion big enough to diſcharge the Matter with the aqueous Humour; but with Caution at the ſame time to avoid wounding the *Uvea* behind the Matter. If the Matter does not diſcharge freely of itſelf, you muſt aſſiſt it by a gentle Preſſure and Agitation with your Fingers: And in about three or four Hours after the Operation, you muſt dreſs the Eye with a Compreſs dipt in a Collyrium *ex Aq. Plantaginis vel Roſar. & Albo Ovor.* or a Mucilage *ex Sem. Cydonior.* prepared, either of them, with or without Camphor. By this Means you will find the Wound in the *Cornea* quickly healed, and the aqueous Humour ſoon after reſtored, with the Patient's Sight, if none of the internal Parts are injured. And though there may remain a ſmall *Cicatrix* in the *Cornea*, yet that being made lower than the Pupil, will cauſe very little, if any, Impediment to the Sight. In the mean time, to perform this Operation with the Lancet ſafely, you ought to involve that Inſtrument in Lint, or a Piece of Plaſter, ſo as to leave not above a Straw's Breadth of its Point uncovered, that it may not run too far into the Eye. MEEKREN has on this Account invented an Inſtrument purpoſely for the Operation, publiſhed in the Tenth Chapter of his Chirurgical Operations, and delineated in our *Tab.* XVIII. *Fig.* 10. Method of operating.

V. Sometimes the purulent Matter is found too much inſpiſſated to be eaſily diſcharged through the Inciſion made by the Lancet in the *Cornea*: And in that Caſe it will be more convenient to uſe the Needle, *Tab.* XVIII. *Fig.* 12. which we have elſewhere propoſed for making Setons. For the recurve Point of this Needle is not only leſs apt to wound the *Uvea*, but by its triangular Figure it alſo makes a larger Aperture, which will more readily diſcharge the inſpiſſated Matter: But then we uſually involve this Needle almoſt up to its Point in a Slip of ſome Plaſter, as I before adviſed you to do the Lancet. PLATNERUS has given Another Method of Cure.

us the Figure of a particular Inſtrument for this Purpoſe[a], having a Sort of triangular *Apex*, the Invention of which he aſcribes to Mr. WOOLHOUSE. See our *Tab.* XVIII. *Fig.* 13. When the Matter included under the *Cornea* is too thick to flow out of itſelf, or by Preſſure, M. ST. YVES[b] propoſes to waſh it out by injecting with a ſmall Syringe, repeating the Operation every Day, till it be all removed: And then you may proceed to heal the Wound in the *Cornea*. If any Inflammation appears, the Patient ſhould be bled, bliſtered, ſcarified, and the affected Parts treated with a diſcutient Fomentation, and other proper Medicines.

CHAP. LXI.

Of Inciding the CORNEA, *to diſcharge Extravaſated* BLOOD.

When the Operation is neceſſary.

I. BLOOD extravaſated in but a ſmall Quantity from external Violence, or Injuries offered to the Eye, may be generally diſperſed and carried off by the diſcutient Remedies before propoſed at N° II. of the preceding Chapter. But when the Quantity is larger than can be thus removed, you ought immediately to open the *Cornea* by Inciſion, as we directed in the preceding Chapter, to prevent the ſtagnant Blood from ſuppurating and deſtroying the Eye.

An Inſtance of this Practice.

II. But leſt any body ſhould think I propoſe of my own Head a raſh and unheard-of Practice, I ſhall give the Reader an Inſtance of it (from the *Hiſt. Acad. Pariſ. An.* 1709. pag. 16. *Edit. Amſtel.*) in which it ſucceeded very well. Therefore, whenever any Perſon has, by ſome external Violence, had ſo much Blood extravaſated in his Eye, as to deſtroy his Sight, and be incapable of Diſperſion, it is the Advice of the Phyſician GANDOLPHUS, to have Recourſe to this Practice. He therefore inſtantly made a tranſverſe Inciſion through the *Cornea*, and, by that means, happily diſcharged the extravaſated Blood, in ſuch a Manner, that the Patient was cured with hardly any Pain, and without any deforming *Cicatrix*, ſo that he recovered his former Sight without any Defect: And yet he was obliged to perforate the *Cornea* three Times, by reaſon of the Quantity and ſtrong Adheſion of the Blood. To promote the healing of the Inciſion, he, for the Space of eight Days, applied Compreſſes dipt in a Mixture of *Aq. Plantag.* ℥iv. *& Aq. Vulneraria* ℥ij. In little more than a Week's Time, the Cure was ſo well performed, that one could perceive no Difference betwixt the Eye that had undergone the Operation, and the other which had not; excepting only that it's Pupil was a little larger than the other, which ſeems to have been rather the Effect of the Blow than of the Operation.

[a] *Diſſert. de Fiſtulâ lacrymali.* [b] *De Morb. Ocul.* p. 227.

CHAP.

CHAP. LXII.

Of the DISTENTION *and* PROLAPSUS OCULI, *alſo the* FUNGUS *and* CANCER.

Nature of the Diſorder.

I. SOMETIMES the Eye is ſo violently inflamed and ſwelled, that it cannot be contained in its Orbit or Socket by the Lids, but protrudes itſelf out of its natural Seat. This is a Diſorder attended not only with great Deformity, but alſo with intenſe Pains, and frequently Blindneſs or an obſtinate Cancer. How ghaſtly the Diſorder appears, may be perceived, I think, from the Figures we have given of it in *Tab.* XVIII. *Fig.* 14, 15[a]. PAREY mentions a Caſe he ſaw, in which the Eye was ſo vehemently diſtended by pernicious Humours, that it at laſt burſt out of its proper Coats; and the like may be alſo ſeen in MUYS, *Dec.* II. *Obſ.* I. This is termed by the *Greeks* a *Proptoſis*, and by the *Latins* a *Prolapſus Oculi:* But by ſome it is denominated an *Hydrophthalmia*, and by others *Eſcophthalmia*[b], when the Eye is very much diſtended with a watery Humour; but the more modern Authors have, from its Similitude, named the Diſorder, *Oculus Bovinus aut Elephantinus.* Though I muſt confeſs that many of theſe Names are rather intended to ſignify different Diſeaſes than one and the ſame; whence Error and Confuſion. The Cauſes of this Diſorder are various, being ſometimes from a violent Inflammation, or a Redundancy of Humours in the Eye, from an Obſtruction of the reductory Veſſels; ſometimes from a *Scirrhus*, Cancer, or ſome external Violence. The Inſtances given us by HILDANUS, *Cent.* I. *Obſ.* I. MUYS, *Dec.* XII. *Obſ.* 1. and by me, in *Tab.* XVIII. *Fig.* 15. ſeem to have been from a Cancer: And more Inſtances of the ſame Kind may be ſeen in STALPART, VANDER WIEL, *Part* II. *Obſ.* 9. and in the other Writers of Obſervations. Laſtly, there are ſome Surgeons and Phyſicians who denominate this Diſorder *Ficus* or *Fungus*, which are in reality different Diſeaſes.

Cure by Diſcutients or Puncture.

II. When the Diſorder is recent, and the Figure of the Eye is not yet deformed, thoſe Humours, producing the *Hydrophthalmia*, may be generally diſperſed by Bleeding, Purging, and Veſicatories, with internal Attenuants and Diluents, and external diſcutient Fomentations. But, if the Caſe is too obſtinate to yield to Remedies, you muſt have Recourſe to the chirurgical Operation of *Paracenteſis*, as in other dropſical Caſes. This *Paracenteſis* muſt be made either with a Lancet, or a ſmall *Trocar*, to diſcharge the offending Humours, repeating the Diſcharge every Day, or every other Day, or as often as ſhall be found neceſſary. At every Dreſſing, a concave Plate of Lead, with a Compreſs dipped in ſome diſcutient Liquor, (ſee *Chap.* LX. *N.* II.) ſhould be firmly ſecured upon the Eye, to recover its natural Figure. By carefully

[a] *Vid.* BARTISCHIUS in *Chirurg. Ocular.* p. 218. and HILDAN. *Obſ.* 1.
[b] *Vid.* NUCKE *De Duct. Aquoſ.* p. 119. & 120. STALPART. VANDER WIEL, *&c.*

obſerving this Method, NUCKE[a] cured a Patient of an *Hydrophthalmia*, though he made his *Paracenteſis* in the *Cornea* itſelf: But as that may leave an ugly *Cicatrix* in the *Cornea*, I rather make my Perforation with a Lancet in the *Sclerotica* than in the *Cornea*. After diſcharging the Humours, I dreſs the Eye with Lint dipt in *Aq. Roſar. & Album. Ovor. permiſt.* defend it with the Leaden Plate, and then apply my Compreſs dipt in *Sp. Vini*; and laſtly, my Bandage, not neglecting Internals at the ſame time, till the Eye is cured, and recovers its State.

Cure by the Scalpel. III. When the natural Figure of the Eye and its Office of Viſion are deſtroyed, and the Pains become more and more intenſe, there then remains but one, and a lamentable Method, of relieving the Patient, by making a tranſverſe Inciſion through the Coats of the Eye, and diſcharging the contained Humours: Which done, and the Eye deterged as in other Ulcers, you muſt cover the Eye-lids with Compreſs and Bandage. But if, after the Humours are diſcharged, the Eye remains larger than can be eaſily covered with the Eye-lids, it will be neceſſary to cut off ſo much as is redundant with the Scalpel or Sciſſors: By which Means the Deformity may be afterwards the better concealed by an artificial Eye. Sometimes the Surgeon may cut out the *Cornea* by a circular Inciſion, in this Diſorder, as we propoſed in the *Staphyloma*, Chap. LVIII. preceding.

Another Method of Cure. IV. BARTISCHIUS, HILDANUS, and MUYS, have contrived a crooked Scalpel, like a Spoon for extirpating the Eye when it is thus diſordered: But, upon mature Conſideration, I believe the Surgeon will not ſtand in need of any ſuch Inſtrument. For, to ſay nothing of the Difficulty you will meet with in ſharpening and uſing ſuch an Inſtrument, it will be found, in moſt Caſes, ſufficient to extirpate only the redundant or tumified Part of the Eye, which prevents the Eye-lids from cloſing: To which you may add, the Danger there will be of wounding and uncovering the thin Bones which compoſe the Orbit, by this crooked Scalpel. But if ever the Surgeon ſhall find it neceſſary to extirpate the whole Eye for a *Scirrhus*, or cancerous Diſorder of it, he may perform the ſame with equal Advantage by the ſtrait Scalpel, *Tab.* XII. *Fig.* 14. which is the ſame I uſed in extirpating thoſe ghaſtly Tumors of this Kind, repreſented in *Tab.* XVIII. *Fig* 14, and 15. Though there are ſome Surgeons who think it the mildeſt Practice to free the Eye ſo far from its Orbit by a Scalpel, till you can make a Ligature about the Protuberant Part in order to remove it, by that Means, like other Excreſcences. But the more prudent in the Profeſſion generally prefer any Method to this, becauſe of the intenſe Pain, Inflammation, and Convulſions, which, by this Means, torture and often kill the Patient. Therefore whenever you meet with the Eye infeſted, even to its Root, with a *Schirrhus* or Cancer, there is no ſafer Method of relieving the Patient from his painful Diſorder, than by extirpating it clean out from the Orbit, in the Manner performed by HILDANUS and MUYS; detergiug and healing the Wound afterwards in the uſual Method.

[a] Lib. *De Duct. Oculor. aquoſ.* pag. 120. and VALENTINI in *Miſc. Nat. Cur.* Ann. VI. Obſ. 70.

V. It

V. It ſometimes happens in this Diſorder, that after having performed the Operation, a new fleſhy Excreſcence ſprouts up over the Eye, and forms a freſh Tumor: To prevent which, you muſt dreſs with Lint dipt in *Aq. Phagedænica*, and make a pretty tight Deligation over the Leaden Plate with which you are to cover the Eye. It may be here alſo obſerved, that Cancers of the Eye, like the ſame Diſorder in other Parts, will very often return, after they have been ſeemingly cured by the Operation and Treatment here propoſed, and may be again removed by the ſame Practice; as appears from the Obſervation of Muys, before cited. Laſtly, when the Diſorder ariſes from a *Caries*, or *Spina ventoſa* of the Bones themſelves compoſing the Orbit, if it will not give way to Mercury (as it often does) the Phyſician muſt then be content to palliate the Diſorder, relieve the Pains, and prevent its bad Conſequences: For a total Removal thereof is frequently altogether impracticable.

CHAP. LXIII.

Of Artificial Eyes.

I. THE Loſs of an Eye is frequently occaſioned by a Wound, an Abſceſs in the Small-Pox, or an Operation in Surgery: And then the unhappy Patient is deſirous of concealing his Misfortune by an artificial Eye, which is contrived to hide the Deformity ariſing from this Accident. The modern artificial Eyes are made of concave Plates of Silver, Gold, or Glaſs ſtained or enameled, ſo as to reſemble the natural Eye. See *Tab.* VII. *Fig.* 1. The nearer it approaches the ſound Eye in Size and Appearance, the more firmly it will ſtay under the Eye-lids, and the more eaſily deceive the Spectator. But it will be frequently neceſſary for the Patient to wipe his artificial Eye clean, leſt if any Gum or Sordes ſhould gather upon it, the Fallacy might be thereby diſcovered: To prevent which, it may be alſo proper for him to be provided with ſeveral of theſe artificial Eyes, that if one ſhould happen to be loſt, broke, or diſfigured, its Place may be immediately ſupplied with another. Upon going to Bed, it is proper to diſmount the artificial Eye, and to replace it again under the Eye-lids, after he wakes in the Morning. But then, that the artificial Eye may be taken out and put in with Neatneſs and Conveniency, the Surgeon muſt take care to remove ſo much of the diſordered Eye, as will make Room for receiving the artificial. Their Compoſition.

II. It is here to be obſerved, that the more cloſely the artificial Eye is compreſſed by the Eye-lids, and by the diſeaſed Eye, the more perfectly it will perform the Motions of the natural Eye, which it will receive from the remaining Muſcles which agitate the diſeaſed Globe. It is therefore not without Reaſon that we before adviſed the Surgeon to remove no more of the Eye than what was preternaturally projected beyond its anterior Part: Except when a *Scirrhus* Motion of the artificial Eye.

or

or Cancer ſhould require an Extirpation of the whole; and then indeed it cannot be expected that the artificial Eye ſhould have any other Motion than what it receives from the Lids.

It is ſometimes better to be without them.

III. I have ſeveral Times obſerved ſome of theſe artificial Eyes produce Pain, Inflammation, Tears, and other Inconveniencies, by irritating the Parts which are not of a proper Conformation, or when the artificial is not right ſhaped; ſo that they will often inflame, weaken, and deſtroy the Sight of the ſound Eye. In ſuch Caſes, it will be beſt for the Patient either to provide himſelf with an artificial Eye which is better adapted, or elſe totally to relinquiſh the Uſe of them, rather than loſe the Uſe of both Eyes.

CHAP. LXIV.

Of the STRABISMUS, *or* SQUINTING.

Cauſes.

I. WE frequently meet with Perſons whoſe Eyes, when they look upon any thing, are diſtorted, or turned towards the outer or inner Corners of their Eye-lids, inſtead of being directed towards the Object: Which is the Diſorder commonly termed *Strabiſmus*, or *Squinting*. Sometimes only one Eye, but more frequently both are thus affected. The Diſorder is frequently cauſed in Infants, from letting them conſtantly ſuck at one and the ſame Breaſt, or placing them in the Cradle, ſo that they always look the ſame Way towards the Light or Window. By this repeated Action, the Muſcles on that Side become too ſtrong and powerful to be balanced by the reſt which counter-act them on the other Side of the Eye; whence it is contorted, or looks obliquely. But this Diſorder is more frequently cauſed in Infants from convulſive and epileptic Motions; to which the Muſcles of their Eyes, as well as of their other Limbs, are extremely ſubject. Laſtly, it may proceed as well in Adults as Infants, from a Spaſm and Rigor, or from a Palſy in one or two of the Muſcles of the Eye, as alſo from a Defect or Inſenſibility in ſome Part of the *Retina*. For when that Part of the *Retina* which is oppoſite to the Pupil, and receives the Impreſſion of the Object, is from any Cauſe rendered inſenſible, the Patient is then obliged to turn his Eye obliquely, till the Pupil directs the Rays from the Object upon ſome other ſound Part of the *Retina*, in order to ſee the ſame.

When and how it may be cured.

II. Squinting is a Diſorder which is hardly ever cured without Difficulty, more eſpecially when in Adults, and cauſed by ſome Defect in the Muſcles or *Retina* of the Eye (eſpecially if the Diſorder ariſes from a bad Habit only.) But in young Infants you will probably ſucceed, according to the Advice of M. ST. YVES,, by frequently placing them before a Looking-glaſs, that their Eyes may be directed towards the Image of their own Face. Thoſe more advanced in Years may be aſſiſted by reading very ſmall Writing, or inſpecting very minute Objects, provided you direct them to turn their Eyes even, and to bathe them at Times with *Aq. Hungar.* or anoint them with the *Balſamum Floravanti*. There are others who propoſe to cure this Diſorder with a Sort of

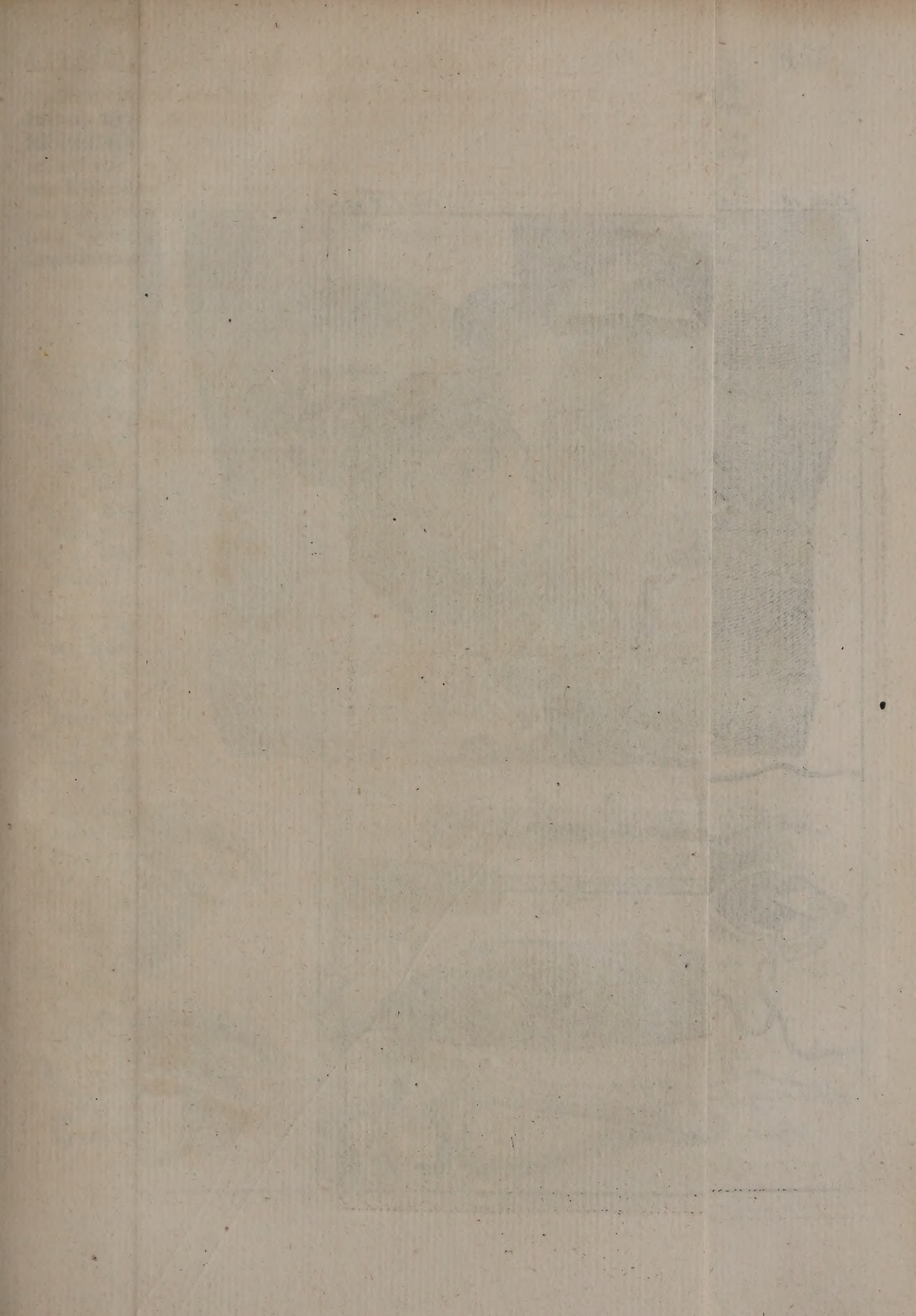


Fig. 14.

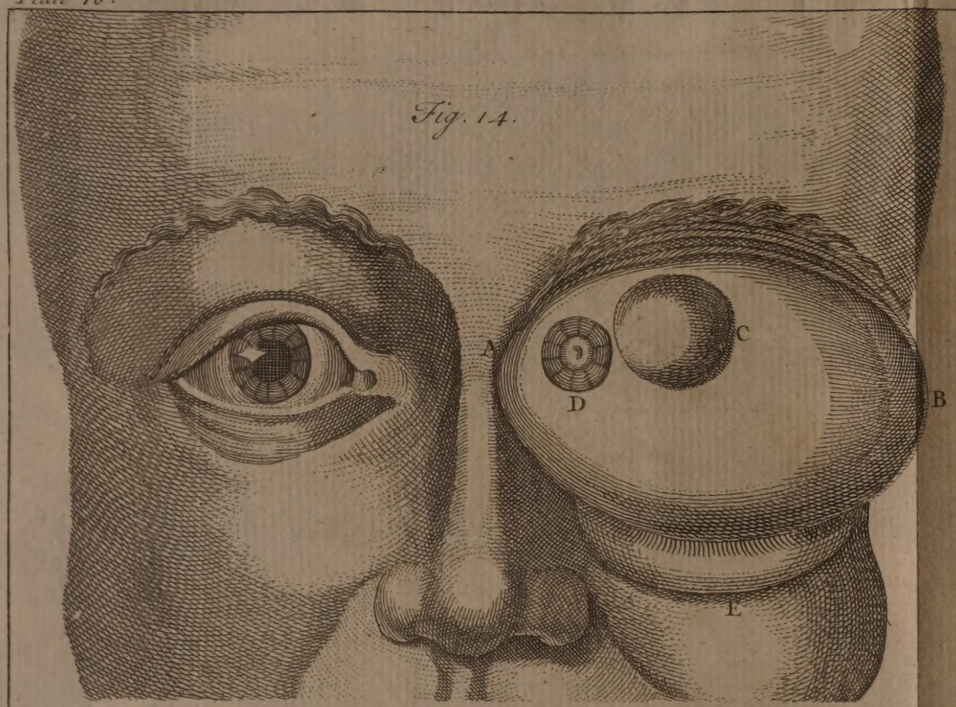


Fig. 15.

Fig. 8.

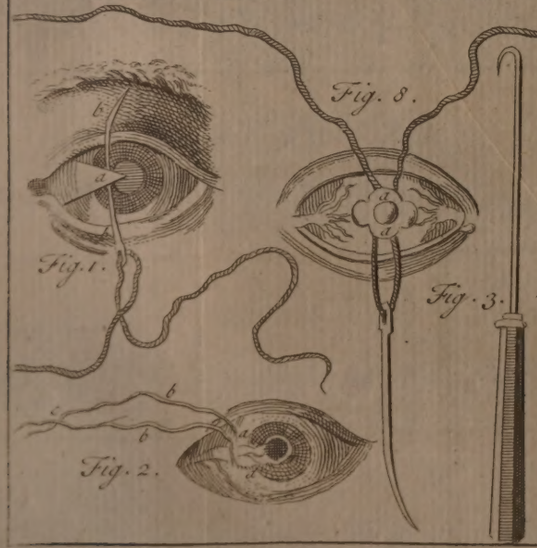


Fig. 1.

Fig. 3.

Fig. 2.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

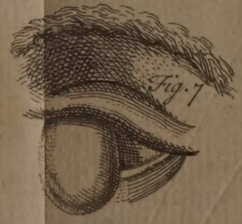


Fig. 13.

Fig. 10.

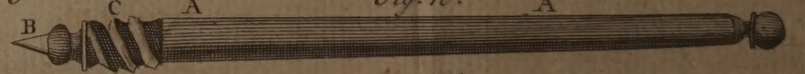


Fig. 12.

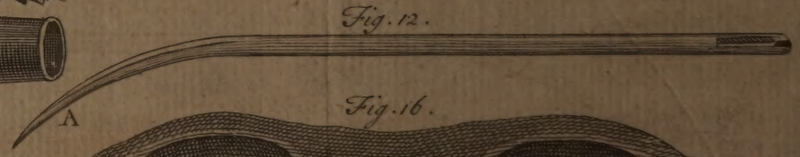


Fig. 11.

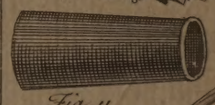
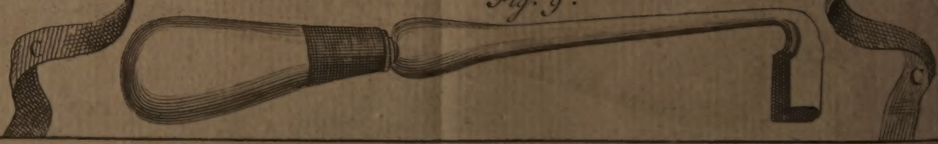


Fig. 16.

Fig. 9.



Mask or Eye-swath, as in *Tab.* XVIII. *Fig.* 16. taken from SOLINGEN, and described more particularly in the Explanation of the following Table. This Method is also recommended by BARTISCHIUS in his *Ophthalmoduleia*, pag. 15, 16 and 17. But, lest Infants should look strait through the Aperture with only one Eye, and squint in the mean time with the other, it will be best to bind up one Eye till the other is rectified, and then to correct the other in the same Manner; which is seldom practicable, through the Unruliness of Infants, and other Impediments.

An EXPLANATION *of the* EIGHTEENTH PLATE.

Fig. 1. Denotes an *Unguis a* on the Eye, with the Method of passing a Needle and Thread under it *b b*, for its Removal

Fig. 2. Represents another *Unguis*, or *Pterygium a a*, with a Thread tied round it *b b*, and at their Extremities tied in the Knot *c*, to form a Loop for extending and elevating the same: But that the Thread may not slide upon the Film, it is first tied with the double Knot *a*.

Fig. 3. Represents a Hook used in separating Films, and other Tubercles, from the Eye.

Fig. 4. Denotes a front View of a *Staphyloma*, or Protuberance of the *Cornea*, which I cured.

Fig. 5. Gives a lateral View of the same *Staphyloma*.

Fig. 6. Represents a front View of another larger and more depending *Staphyloma*, which I cured.

Fig. 7. Gives a lateral View of the same.

Fig. 8. Is a lesser *Staphyloma*, marked *a a*, with a double Thread passed under it, from SOLINGEN.

Fig. 9. A *Scalprum*, to scrape or exfoliate carious Bones in the *Fistula lacrymalis*, from PLATNERUS's Dissertation *De Fist lacr.*

Fig. 10. Represents MEEKREN's Instrument for perforating the *Cornea* in an *Hypopyon* AA the Handle; B the Scalpel, or rather the Point of a double-edged Scalpel, having a Button or Protuberance at its Basis, to prevent the Point from entering too deep into the Eye: C the Screw by which the *Capsula* or Case, *Fig.* 11. is fastened on.

Fig. 12. Denotes a large Needle which may serve to make Setons; but is here designed to perforate the *Cornea* if you secure it from entering too deep, by involving it in a Slip of Plaster up to A.

Fig. 13. Represents an Instrument designed to perforate the *Cornea* in an *Hypopyon*. A denotes the Handle, B the triangular Point a little crooked, almost like the preceding Needle; which should, like that, be involved in a Slip of Plaster up to the Point, to prevent its entering too far beyond the *Cornea*.

Fig. 14. The Letters AB denote a scirrhous Eye, enlarged to the Size of an Hen's Egg, upon which is a blackish Tubercle, like a Grape, marked C; and D denotes the vitiated Pupil and *Cornea*. E the lower Eye-lid depressed by the Tumor.

Fig. 15.

Fig. 15. Denotes a larger Fungus of the left Eye, weighing half a Pound, which, with the preceding, I extirpated and cured in 1721, the particular Nature and Treatment of which I ſhall deſcribe in my *Chirurgical Obſervations*, which I intend ſhortly to publiſh.

Fig. 16. Repreſents a Bandage to cure the Diſorder of Squinting in Children. L. AA. two concave Plates of Silver, Ivory, or Ebony, perforated in the Middle: L. C C the Bandage by which they are fixed to the Eyes. Children are, by this Method, practiſed to direct their Eyes ſtrait forward through the Apertures, and thereby acquire a regular Habit.

The END *of the* FIRST VOLUME.

INSTITUTIONS OF SURGERY.

PART the SECOND.

SECT. II.

Of DISORDERS in the EARS.

CHAP. LXV.

The Apertion of a closed MEATUS AUDITORIUS.

THE *Meatus Auditorius* is sometimes closed from the Birth with a Membrane differing in Degrees of Thickness, formed sometimes immediately after the Birth, and sometimes a considerable while after, when the Child should begin to talk: for Deafness and Dumbness almost constantly go together. If the Child be therefore observed not to talk so soon as usual, the Disposition of the Ears and Tongue ought to be examined; because very often one may meet with some Impediment in the Ear, which may be sometimes removed with more or less Difficulty, as it is seated more or less superficially. When the external Ear is closed by a Membrane, its Faculty of Hearing may be restored by removing the Membrane, which may be done without Difficulty when superficial: but when it lies very deep in the Ear, 'tis a more dangerous Case; because in perforating, or removing the preternatural Membrane, you are liable to wound the Membrane of the *Tympanum* at the same Time. When the occluding Membrane is not seated too deep, you may make a cruciform Incision through it, and keep the Passage open with Lint or a Tent as long as you shall see necessary: and thus you will probably cure the Patient

both of his Deafneſs and Dumbneſs. But when the ſaid Membrane is ſeated very deep in the Ear near the *Tympanum*, the Succeſs of your Operation will be very hazardous: yet you ought notwithſtanding to attempt it, ſince he can but be as he is, without his hearing, if you do not ſucceed. You may divide the preternatural Membrane either by a tranſverſe or longitudinal Inciſion, taking care that you do not at the ſame Time wound the Membrane of the *Tympanum*, which in Infants is not ſeated ſo deep in the Ear as in Adults.

CHAP. LXVI.

Of extracting foreign Bodies from the Ears.

THE Hearing is frequently impeded by an indurated Lump of the Ear-wax, or by a Pea, Cherry-ſtone, Inſect, or the like, having ſlipt into its Cavity. Theſe are to be extracted upon two Accounts: firſt, becauſe they give the Patient great Pain and Uneaſineſs; and, ſecondly, becauſe they deſtroy his Hearing. You may know of what kind the offending Body is, partly from the account of the Patient, and partly from inſpecting and ſearching with your Probe. When the Wax is ſo dried up and hardened, as to bring on Deafneſs, you ſhould inject a little of the Oil of Sweet Almonds or warm Milk into the Ear, and order the Patient to hold his Head inclined on the contrary Side while you uſe the Syringe. But the Cerumen of the Ear is often too much indurated to be mollified and diſcharged at one Operation; and therefore you muſt ſyringe the Patient ſeveral Times till the Impediment is removed. If a ſmall calculus, or a Cherry-ſtone, be lodged in it, you muſt firſt of all relax and mollify the Paſſages of the Ear, by dropping in ſome warm Milk or Oil, and then carefully extract the Body with your Probe, or the Pliers repreſented in *Tab.* I. *lit.* E. But if the foreign Body ſhould happen to be a Pea, Bean, or ſome other grain, which is too much ſwelled by the Humours to be diſcharged entire by the Probe, or other Inſtrument, you muſt break it with Pliers, or cut it with ſmall Sciſſars, and extract it by a bit at a time. Sometimes a Flea, or other Inſect, gets into the Ear, and, by ſtruggling to get looſe from the glutinous Ear-wax, excites an intolerable *Pruritus*, and Tickling, which in time turns to acute Pain. Theſe, when you can perceive them, may be drawn out by a Probe or Pair of Pliers; and, if theſe fail, you may inject warm Oil, or Spirit of Wine, which will quickly kill the Inſect, and then you may waſh it out with the ſame, or ſome other Liquor, and afterwards cleanſe the Cavity of the Ear with a Bit of Cotton or Lint upon the End of your Probe. There are ſome who recommend bitter Infuſions or Decoctions of Wormwood, *Colocynthis*, *&c.* to be injected into the Ear to deſtroy the Inſects: but, in my Opinion, warm Oil, or Spirit of Wine, is much fitter for this Purpoſe than any other Liquor. For though Bitters quickly kill ſome Inſects, yet there are others which ſeem to be delighted with them, but I know not of any Inſect which is not quickly deſtroyed in Oil, or Spirit of Wine.

CHAP.

CHAP. LXVII.

Of Tubercles in the Meatus Auditorius.

MANY Patients are troubled with Tubercles, or fleshy Excrescences in the auditory Passage of their Ears, which give them great Uneasiness, and do partly, if not totally, obstruct their Hearing. When they are not of long standing, you may remove them with Escharotics, if you first arm or defend the auditory Passage, by filling it with Lint or Cotton, that none of the Caustic may touch the Membrane of the *Tympanum*. To avoid this it will be preferable to extirpate them by the Scissars or Scalpel, when they are not seated too low in the Ear. If these Tubercles are too much concealed in the Cavity of the Ear to be conveniently removed by the Scalpel or Scissars alone, you may extend and elevate them with a hook; or if they are very accessible, and the Caustic does not take effect, you may apply the actual Cautery with Success. Lastly, it is apparent, from the Observations of HILDANUS (*Cent.* 3. *Obs.* 1.) and PURMANUS (*Chirurg.* pag. 280) that these Tubercles may be frequently removed with Success by ligature. Consult the Cases related by those Authors, which are illustrated with Figures.

CHAP. LXVIII.

Of Cauterising behind the Ears for the Tooth-ach.

IT has been observed by NUCKE, SOLINGEN, DEKKERS, VALSALVA, and many other ingenious Physicians, that obstinate Pains of the Teeth, which could be relieved by no Medicines whatever, have yet been speedily removed by cauterising behind the Ear, underneath that Protuberance which is termed *Antitragus*. The Authors before-mentioned have described and figured the Cautery with its Case for this Operation, as you may see in our *Tab.* XIX. *Fig.* 1. but, in my Opinion, a common Nail, or bit of Iron Wire, would do as well. It is indeed remarked by the celebrated Anatomist and Physician SPIGELIUS, that SCULTETUS happily cured the Tooth-ach by cauterising the Part mentioned by plunging a red-hot Scalpel into it: and VALSALVA asserts, that he has had equal Success barely from making an Incision in this Part without heating the Scalpel at all. But what should occasion so sudden a Removal of the Tooth-ach from this Practice? Some will answer, it is by burning or dividing a Nerve which passes from this Part of the Ear to the Teeth, which must consequently make them insensible of Pain. But, for my own Part, I must confess, when the Patient is so suddenly relieved by this Practice, I think it rather proceeds from the Fright, than from the Cauterisation of any Nerve, since we cannot find any that passes from thence to the Teeth: and I know it is not an unusual thing for a very intense Tooth-ach to vanish at the Patient's Sight of the Surgeon's Instrument, with which the Tooth is to be drawn. Lastly, I must not omit observing, that notwithstanding what others affirm, I have often tried

this Practice without the desired Sucefs: therefore it will not anfwer to the Character given of it by its Patrons [a].

CHAP. LXIX.

Of Acouftic Inftruments to help the Hearing.

AS a weak Sight may be rendered ftronger by concentrating the luminous Rays to the Eye with Glaffes, fo the Hearing may be alfo affifted by collecting and concentrating the fonorous Rays by acouftic Inftruments. There are feveral Sorts of thefe Inftruments, but all of them bear a Refemblance to the Trumpet. That Sort which is found to be the beft and moft commodious, is that in *Tab.* XIX. *Fig.* 2. beginning with a fmall *Apex*, and ending in a broad *Bafis*, the whole being a little crooked. Thofe are alfo highly recommended by NUCKE and DEKKERS, which we have repreferted at *Fig.* 3, and 4. The two former of thefe at *Fig.* 2 and 3. are ufed by fixing the fmall End A into the Cavity of the Ear, holding the Part B in your Hand. The third and laft of thefe Hearing-trumpets is much the fmalleft, and made in the Shape of a Snail's Shell, and is, by DEKKERS, recommended for its Conveniency above the former; becaufe, by its Smallnefs, it may be placed under the Cap or Wig without being obferved, and then you faften it by Strings round the Ear. But Experience teaches us, that the firft of thefe Inftruments is the beft, though the moft fimple, and leaft expenfive. It was reported a few Years ago in the public News, that one TRUCHET, a Mathematician and Monk in *France*, Fellow of the Royal Academy, had, by his great Ingenuity, contrived at *Paris* an acouftic Inftrument fo fmall, as to be concealed under one's Wig, and yet fo powerful, as to augment the Hearing beyond all Belief. But I have never yet been able to learn, by Letters fent to my Friends at *Paris*, and others, any thing at all concerning the Truth, Make, or Ufefulnefs of this Inftrument. Yet I think Mechanics ought to be encouraged to greater Diligence in thefe Sort of Machines, becaufe they may redound to the general Ufe of Mankind. We have a kind of Silver Trumpet gilt, of a Span's Length, propofed a few Years ago by REUSNERUS for Deafnefs, Pains and Tinglings in the Ears, (*Ephem. Nat. Cur. Cent.* V. *Obf.* VI.) which he orders to be inferted twice a Day into the Ear, and thereby to fuck out the foreign Air which offends that Organ; which is too whimfical to need any farther Notice. In the mean Time I muft recommend the firft Tube in Shape of a Horn, *Fig.* 2. as the beft and moft commodious Inftrument we are yet furnifhed with, to affift thofe who are hard of Hearing, which may be made either of Silver or Brafs.

[a] SCHELHAMMER, in his Treatife on the Tooth-ach, tells us it may be cured by a ftrong Preffure of the Fingers on this Part of the Ear.

CHAP.

CHAP. LXX.

Of boring the Lobes of the Ears.

TO bore or perforate the *Lobes* of the Ears, you muſt firſt of all mark the Place with a Spot of Ink, which ſhould be generally in the middle, and then with a common large Needle, after extending the Lobe betwixt your left Fore-finger and Thumb, you perforate it in the Mark, and inſert an Ear-ring, or the ſmall Plummit of Lead, *Tab.* XIX. *Fig.* 7. bending it into a Ring after it is introduced: this you dreſs two or three Times a Day with *Ol. ovor. aut Hyperici*, and gently ſhift or draw it round through the Puncture till it is healed. But for Ear-rings it is generally better to perforate a little higher than the middle of the Lobe, leſt it ſhould be lacerated, or cut through by them. To perform this Operation with little Trouble to the Surgeon, and leſs Pain to the Patient, we are furniſhed with an Inſtrument for compreſſing and ſecuring the Lobe of the Ear before and while you perforate it, as in *Tab.* XIX. *Fig.* 5. The two Cheeks of the Inſtrument are applied, ſo that the *Foramen* B covers the Spot of Ink on the Lobe; then the Ring A is thruſt upwards, ſo as to compreſs the Part, and render it leſs ſenſible. You next perforate the Lobe with a Bodkin of Silver, or Gold, or rather with a ſteel Needle almoſt like the common Sort, only furniſhed with a Cavity in the obtuſe End, as in *Fig.* 6. A B, to introduce the leaden Plummit, *Fig.* 7. which is then left in the Ear, and ſhifted round, as I before directed, till the Puncture is healed. Inſtead of the laſt mentioned Needle, others uſe one with the obtuſe End ſlit, like the larding Needle of Poulterers, as at *Fig.* 8. This more readily introduces the leaden Plummit, which is to be placed in the Slit, when the Needle has gone half through. Tho' this Operation is, for the moſt part, rather ſubſervient to Pride and Ornament than any Uſe in Phyſic, yet if we may credit RIVERIUS (*Obſ.* 100.) and ſome others, it proves of very great Conſequence againſt ſeveral Diſeaſes. For, ſays RIVERIUS, the Revulſion made by paſſing a red-hot triangular Needle through the Lobe of the Ear, and the great Diſcharge made by drawing a Thread of Silk or Linen through it, cannot but expel and divert peccant Humours from the Eyes, Teeth, *&c.* and may even vanquiſh a *Tabes*, and the moſt obſtinate Diſorders of the Breaſt. We therefore need not ſo much wonder ſome Oculiſts and others ſhould have made this Operation more common of late than it was formerly; ſince it is not only countenanced and approved of by RIVERIUS, but alſo PARACELSUS and M. A. SEVERINUS (*Lib. de Effic. Medic.* pag. 73.) judge it to be an uſeful Operation to relieve an incipient Deafneſs.

Of Chirurgical Operations in the Noſe.

CHAP. LXXI.

Of a Polypus *in the Noſe.*

Deſcription and Kinds

I. THE internal Parts of the Noſe are, like many other Parts of the Body, frequently infeſted with fleſhy Excreſcences, which, in this Organ, we uſually term *Polypuſes*; though we ſeldom find them to have more Feet or Roots than one. Some call them *Sarcoma's*, others *Hyperſarcoma's*. Theſe Caruncles are of various Sizes, and of different Conſiſtences: frequently they are ſoft, and ſometimes extenſible, or capable of Elongation; but, by Accident, they now and then turn out hard and rigid. Sometimes they appear paler, and ſometimes redder than uſual; but, in their Beginning, they are generally ſmall, and advance gradually, though ſome much faſter than others: and I have even obſerved ſome of them to grow ſo faſt, that, in three or four Days Time, they have hung down out of the Noſe. Uſually they are not attended with Pain; but ſome of them, which are hard and livid, are extremely painful, inclining in ſome Meaſure to be cancerous. Some are imperceptibly concealed within the Noſe, others hang out of that Organ down to the Lips; ſome fill up and much diſtend the Noſe; ſome again appear as one Caruncle with an even Surface, and others like a Cluſter [a]. Some of them deſcend backward through the Apertures, by which we draw the Air through the Noſe into the Fauces, and grow ſo big as to be viſible behind the *Uvula*; and then they occaſion not only great Difficulty of ſpeaking and ſwallowing, but ſometimes almoſt ſtrangle the Patient. Sometimes again they extend themſelves both forwards through the Noſe, and backwards into the Fauces: but it is ſeldom that both Cavities of the Noſe are thus obſtructed. Generally the *Polypus* has but one Root, as we obſerved, which is ſometimes ſlender, and ſometimes thick, beſet with large Veins; not but that one may now and then by accident meet a *Polypus* having many Roots, whence the Antients [b] ſeem to have denominated the Diſorder. Very often they ariſe from the lower, middle, back, and upper Part of the Noſe [c], and ſometimes even from the *Os ethmoides*, or adjacent Sinuſes of the *Cranium*. But *Polypuſes* are moſt frequently formed in and from the pituitary Membrane, and particularly by an Obſtruction of one or more of its Glands, which being gradually enlarged by peccant Humours, at laſt fills the whole Noſe or hangs down out of it. The Diſorder therefore ſeems to be nothing more than a morbid

[a] GLANDORP, *de Polyp.* Cap. III. will have all *Polypuſes* to be unequal; which is not juſt, becauſe I have ſeen ſeveral otherwiſe.

[b] See CELSUS *Lib.* VI. Cap. 8. No 2.

[c] FABRIC. AB AQUAPENDENTE, *in Oper. Chirurg.* Cap. *De Polypo*, will have all *Polypuſes* to be annexed to the *Os ſpongioſum*, which I have experienced to be falſe.

Disposition of the spongy Production and Glands of this Membrane. So that in my Opinion this Disorder is different from those Caruncles in the Nose, which are usually termed *Sarcoma's Nasi:* for a *Polypus* is generally soft, and hangs by a slender or thick Root as by a Stalk, like a Fig [a]; but a *Sarcoma* is more of a fleshy Consistence, and adheres by a large, firm, and immoveable Basis.

II. Having described the Disorder, and its Kinds, we shall now examine the State and Condition of it, with the most usual productive Causes. And, first, those *Polypuses* which appear whitish, or of a pale red, being without Pain, are of a mild Nature: whereas those are very bad which appear hard, painful, and of a black or blue Colour, or which discharge a purulent Matter, or fetid and acrid Humour, for such are tending to a cancerous Disposition. *Polypuses* often arise from internal and latent Causes, and sometimes from external injuries or Violence. By the latent internal Causes we mean an Obstruction in the small Glands and Vessels of the pituitary Membrane, from an infected or inspissated Blood and Lymph; by a Congestion of which Humours that spongy Membrane may be easily distended or tumified. Under the Causes from external Violence we may reckon violent Falls or Blows, too frequent Intrusion of the Fingers into the Nose, irritating or scratching the pituitary Glands, to which add sternutatory Powders which are too strong and acrid. Lastly, among the internal manifest Causes, are too profuse Hæmorrhages, Catarrhs or Defluxions, and Ulcers. *Sarcoma's* are produced by much the same Causes, and both of them are often attended with a *Spina Ventosa*, or Caries of the *Ossa Nasi*, of which deplorable Case I have seen several Instances. Diagnosis and Causes.

III. The Danger is much less, and the Cure more easy in *Polypuses* of the mild Disposition; as likewise those that are seated not very far in the Nose, being soft, pendulous, extensible, and supported by a slender Root, the Patient being also of a good Habit. On the contrary, those which are more inaccessible, supported by a large or broad Basis, and appear hard, or less capable of Elongation, such are very difficult to cure or remove, especially when the Patient is afflicted with a scorbutic or venereal Disorder at the same time. The removal of them is also attended with no small Danger from the Difficulty of suppressing the profuse Hæmorrhage, which arises after the Extirpation or Evulsion of a *Polypus*, especially one that has a broad Root or Basis: Indeed Aquapendens makes slight of this Danger, but unjustly; for you should be very cautious of removing such a *Polypus*. If the *Polypus* inclines to be cancerous, that is, when it appears hard, livid, and very painful, as is not unfrequent, it will be safer for you to palliate the Disorder by a proper Regimen, Diet, and internal Medicines, since it is dangerous irritating it, like other Cancers. In like Manner when the *Polypus* is inaccessible with a broad Basis, or caused by a *Spina Ventosa*, as I remember to have seen a large one, it will be scarce possible to prevent the Tumour from growing again in a little time after its Removal, unless you first cure the *Spina Ventosa*. I know Aquapendens asserts, that he never knew a *Polypus* grow up again; but this has been several Times observed by myself and others; see Le Dran *Obs.* VI. When the Prognosis.

[a] Garrengeot writes, that a *Polypus* generally divides itself into Branches, which is contrary to Experience; for they are generally simple, as I have often seen.

Polypus

Polypus extends itſelf into the Fauces, it proves a great Impediment both to the Speech and Deglutition, and ſometimes to Reſpiration, even ſo as to ſuffocate the Patient, as CELSUS had long ago ſeen, and to be incapable of Extirpation without great Danger and Difficulty. Laſtly, when the *Polypus* fills both Cavities of the Noſe, it is uſually much more difficult to cure, becauſe generally attended with a worſe Diſorder. What has been here obſerved will alſo hold true with Regard to *Sarcoma's*, eſpecially ſuch as are joined with a *Spina Ventoſa* of the *Oſſa Narium.*

Prognoſis. IV. The Cure of a *Polypus* cannot be reaſonably expected from any thing but a total Removal; which may be done two ways, either by cauſtic Remedies, or by proper Inſtruments: by either of theſe they may be taken off all at once, or by a bit at a time. Cauſtic Medicines may anſwer our Intentions when the Excreſcence is ſmall and ſoft or ſhort, and with a broad Baſis: but Care muſt be taken at the ſame Time to prevent the cauſtic from corroding the other ſound Parts of the Noſe. The mildeſt Eſcharotics are moſt recommended for this purpoſe, ſuch as the *Pulv. Sabinæ, alum. uſt. præcipitat. rub. vitriol. alb. rad. Hermodaſt. &c.* to be applied either alone, or mixed with Honey, or ſome digeſtive Ointment, impoſed on the *Polypus* by means of a Tent, when it is ſeated internally; but when it appears externally, you may apply it without. POTERIUS (*Obſ.* 63. *Cent.* III.) recommends a Powder of the Roots of *Scorpioides* or *Heliotropium*, as a very gentle Eſcharotic, to be introduced twice a Day into the Noſe with Cotton for removing a *Polypus*, which it will do very readily, and almoſt without any Pain; but which of the ſeveral Species of this Plant is here intended, we are not informed. RULANDUS (*Cent.* VIII. *Obſ.* 81.) extols a mercurial Water, with which he aſſerts he has cured a *Polypus* in a few Days time by wetting therewith every Morning and Evening. For this purpoſe are alſo equally efficacious the *Ung. Ægyptiac. & fuſc. Wurtzii, ol. Tartar. P. D. Eſſent. Sabinæ, vel ſolutio Mercurii ſublimati in Spiritu Vini*, with which laſt WEDELIUS writes, that he cured a *Polypus*. The *Aqua phagedænica* is alſo very ſerviceable in this Caſe, according to NUCKE; as alſo *Mercurius præcipitatus*, upon which a Quantity of *Spiritus Vini* has been deflagrated; or a Solution of *Sal ammoniacum* in Water; or the acid Spirit of that Salt, according to MUSITANUS. If none of theſe take effect, you may have recourſe to the ſtronger Eſcharotics, as the *Lapis infernalis, Merc. ſublimatus, Arcanum corallinum, &c.* But theſe laſt ſhould be mixed with Honey or *Baſilicon* before their Application, that they may not deſtroy the ſound Parts: and if the *Polypus* lies concealed in the Noſe, a ſmall Portion of your eſcharotic Medicine ſhould be conveyed to it through a Quill or other Tube. Still more powerful in conſuming mild *Polypuſes* are the *Spiritus & Oleum vitriol. Aq. fort. ac Butyrum Antimonii*, applied through a Tube by a Pencil, Bruſh, or a Feather. You muſt afterwards daily remove ſo much of the Excreſcence as is eroded by the cauſtic at every Dreſſing, by a Pair of Pliers or Sciſſars. The eminent Surgeon formerly at *Paris* M. THIBAUT proceeds in the following Method: Firſt, he defends the ſound Parts near and leading to the *Polypus* with two Plaſters, that they may not be injured by the cauſtic: then with a Tent or Pencil-bruſh dipt in *Butyr. Antimon.* he carefully touches the *Polypus*, and at laſt waſhes it off with warm Water, that it may not penetrate too deep into the Parts. By this method M. GARENGEOT aſſerts, that he completes the whole Operation in three Minutes

Minutes: but whether he applies the caustic more than once, that Author does not tell us, tho' I am persuaded its Application must be many times repeated to make an entire Destruction of the *Polypus*.

V. But in most Cases the Surgeon will find it safer to remove these Excrescences by Instruments, rather than by Caustics; to do which there are various Methods of operating. But before you enter on the Operation, the Patient must be first prepared by a proper Regimen, Diet, and Medicines: then he must be seated against the Light, with his Head secured, inclining backward, by an Assistant: this done, you may now chuse either of the following Methods of operating, as may appear to be best suited to the Circumstances of the Case. We shall begin first with the most ancient method proposed by CELSUS in *Lib.* VII. *Cap.* X. where he teaches, that the *Polypus* is to be removed, and separated from the Bones by a sharp Instrument in Shape of a *Spatha* [a], taking care not to wound the Cartilage below, which would be very difficult to cure. When the Excrescence is separated, you must extract it with a Steel Hook; and then, with Lint folded up, or a Pencil, apply some Medicine to suppress the Hæmorrhage, with which you are gently to fill the Cavity of the Nose. After the Hæmorrhage is suppressed, the Ulcer must be deterged with Lint. When it is cleansed, you may apply your epulotic Medicine with a Feather, to induce a Cicatrix; in which Method you must continue till the Cure is completed. Not much different from this method of CELSUS is that proposed by ÆGINETA *Lib.* VI. *Cap.* 25. where he directs the Patient to be seated against the Light, and while the Surgeon dilates or opens the Patient's Nose, with his left Hand, with his right to pass a *Spatula* made for the Purpose in the Shape of a Myrtle Leaf, with which he must extirpate the *Polypus* by a circular Incision, applying the Edge of the Instrument against the Adhesion of the *Polypus* to the Nose; and then to extract the Excrescence with the Handle of the same Instrument. To induce a Cicatrix he uses a Couple of leaden Pipes. That the whole *Polypus* is removed may be known partly from Inspection, and partly by the Freeness of the Voice, and the Liberty of Respiration through the Nose. The celebrated *Arabian* Physician and Surgeon ALBUCASIS directs (*Lib.* II. *Cap.* 4.) to extract the *Polypus* as far out of the Nose as you can with a Hook or Forceps, and then to remove it by Incision as conveniently as may be; in which Method you are to proceed till the whole is extirpated. If you cannot thus totally remove the *Polypus*, its Remains may be destroyed by a pretty thick Cord, full of Knots at a Finger's Breadth asunder, introduced and drawn thro' the Nose, and out at the Mouth, and dressed with *Unguentum Ægyptiacum*. But FABRICIUS AB AQUAPENDENTE rejects these Methods of the Ancients upon many Accounts, and endeavours to establish a Practice of his own [b], as he says, for removing these Excrescences by Abscission with a Pair of cutting Forceps [c], which he prefers before any other Method. This Forceps he introduces gently into the Nose to the Root of the *Polypus*, which

Cure by Instruments.

I. According to CELSUS.

II. ÆGINETA.

III. ALBUCASIS.

IV. AQUAPENDENS.

[a] A Sort of Instrument of which we are ignorant; though it is generally described to be a kind of double-edged Scalpel.

[b] SEVERINUS asserts he is not the Inventor of this Method, and quotes several others who used it before him.

[c] Which are figured in his *Oper. Chirurg.* Tab. III. but are different from the Forceps represented by SCULTETUS; but it cannot be perceived how either of them should extirpate a *Polypus*.

he, by this means, cuts clean off, and then extracts it. He justly prefers this Practice as safer than the preceding Methods; and says, that when the whole *Polypus* is not taken off at the first Time, you may, on the following Days, remove more of it by a little at a Time, till it is wholly extirpated. If the Wound bleeds plentifully, which it is not so apt to do in this Method, he directs to suppress it with red Wine and Alum, of which more hereafter. We find that this Method was also practised with great Success by SENNERTUS and GLANDORPIUS, as well as by AQUAPENDENS, and I have several Times known it to succeed myself.

Other Methods of Cure.

VI. There are yet several other Methods of removing *Polypuses*. Those which are recent will sometimes shrink and disappear by repeated Punctuation or Scarification with a Scalpel or Lancet, as SEVERINUS asserts he has experienced. Some recommend the actual Cautery: but the more judicious are not forward for using it, both on account of the Torture it gives, and of the Danger there is of its injuring the sound Parts of the Nose. Some greatly prefer the falciform Scalpel of GLANDORPIUS, figured by ANDREAS A CRUCE, as the most commodious Instrument for extirpating these Excrescences, after you have extended them in a proper Manner with a Hook; but this, in my Opinion, cannot often be used with any Conveniency. MESUE amputates those which have a slender Root, and hang out of the Nose, with a Pair of Scissars; and those which descend towards the Fauces, he draws forwards with a *Tenaculum*, and cuts them off near the Root with a Pair of red hot Scissars. Others again think the Method of separating these Excrescences by Ligature to be the safest and best; especially as by this Means you avoid any profuse Hæmorrhage. For this Reason GLANDORPIUS passes a Thread of strong Silk, waxed, round the Basis or Root of the *Polypus*, and drawing it as tight as he well can, secures it with a Knot, and then cuts off the fleshy Excrescence close to the Ligature. But to perform this with more Ease and Advantage, it will be necessary to extract the *Polypus*, as far as you can out of the Nose, by the Pliers represented in *Tab.* XIX. *Fig.* 9 or 10. This, however, must be done gently and gradually, lest you should break off the Tumour before you have made the Ligature; which must be left upon the Part after your Abscission, till it is digested off spontaneously. And thus you cure the Disorder without running the Hazard of a profuse Hæmorrhage, which is sometimes so large as to kill the Patient, especially when the *Polypus* is removed by Evulsion, as GARENGEOT has observed in his Surgery, Cap. de Polyp. Others leave the *Polypus* remaining entire, after having made their Ligature, till it separates of itself together with the Thread, as I have sometimes done myself. But you ought to make a fresh Ligature on the second or third Day, if you do not perceive it to wither and decay by the first. And in this Manner I lately removed a *Polypus* from a noble Lady in the Space of four Days, without any Pain or Hæmorrhage.

My Method of curing this Disorder by Ligature.

VII. As the *Polypus* last mentioned was removed by a particular Contrivance of my own, I shall, for the Benefit of young Practitioners, give an Account of the Case, and of the Method in which I proceeded. A noble Lady above seventy Years of Age, in other respects well, having been frequently troubled with bleeding at her Nose, perceived a fleshy Caruncle sprouting up in her left Nostril, soon after the Hæmorrhage of her Nose had been stopt by cold Water: this by Degrees advanced, till it not only filled up the Nostril, but even distended and deformed her Nose to a great Degree, so that she could at last scarce

draw

draw any Air through that Organ. She had conſulted ſeveral neighbouring Surgeons and Phyſicians, who, perceiving the *Polypus* to appear externally, had treated it for a conſiderable Time with Eſcharotics, but to no Purpoſe: for as faſt as they conſumed it one Day by this Means, the Tumour grew up as much again the next; and therefore ſhe came for my Advice and Aſſiſtance to *Helmſtadt* in *March*, in the Year 1734. Upon examining the Patient I found a *Polypus* of a dark red Colour, about the Size and Shape of a Damaſcene, appearing partly out of the Noſe, but concealed moſtly within the Noſtril, which it had greatly diſtended. It could not well be drawn out of the Noſe, from the Rigidity and Shortneſs of its Root: but upon ſearching after the Condition of its Root with the Probe, I found it grew neither from above, nor below, but from the Middle of the Side of the Noſe. Upon being aſked by the Lady and her Friends, what Method I judged moſt convenient to remove it by, I began to think if there might not be a gentle Method of removing it by Ligature; ſince Cauſtics had been tried in vain, and to attempt its Exciſion or Evulſion in a Perſon of her Age, could by no Means be expected to ſucceed. I now began to contrive in what Manner I ſhould convey my Ligature round the Baſis of the *Polypus*, which, being here ſeated far within the Noſe, and cloſely filling up its Cavity, made this Part of the Operation no ſmall Difficulty. Therefore while the Patient was preparing, I invented and procured the Inſtrument repreſented in *Tab.* XIX. *Fig.* 12. which anſwered my Intention very well. Through the Aperture B in the Point of the crooked End of this Inſtrument I tranſmitted a double Thread of ſtrong Silk; and fixing the Patient conveniently againſt the Light, I elevated and opened the *Pinna naſi* with my left Hand, and holding the Inſtrument by the Handle A in my right Hand, I conveyed its End with the Thread carefully betwixt the *Pinna* and *Polypus* upwards, and when the Thread came into View, extracted the ſame out of the Noſe; and then gently depreſſing my Inſtrument, laid it aſide, leaving the Thread behind it round the *Polypus* in the Noſe; and drawing the Thread tight, I then tied it with a double Knot. The next Day I repeated the ſame Operation, and afterwards I made a Ligature round the root a third Time in the ſame Manner; by which Means the Excreſcence became very hard and black: On the fourth Day the *Polypus* appearing very hard and black, I pulled the String a little, to obſerve whether it was looſened, and to the Admiration of the Patient and Spectators, it brought away the *Polypus* reſembling a Damaſcene, without cauſing any Pain or Hæmorrhage. The Patient's Noſe afterwards recovered its natural Figure, and ſhe breathed through her Noſtrils as freely as ever.

VIII. But it muſt be owned, that this Method by Ligature will not ſucceed when the Root of the *Polypus* is ſeated much farther in the Noſe, or when it adheres or grows to any Sinus of the *Cranium*. Therefore, to remove theſe *Polypuſes*, whoſe Roots are inacceſſible, you muſt have a Pair of Curve Forceps according to Pigreus, called a *Crow's Bill*, like that in *Tab.* XIX. *Fig.* 9. repreſented from Palfyn, or rather that at *Fig.* 10. whoſe Beak is perforated AA to hold the *Polypus* more firmly; with which Inſtrument you are gently to twiſt and extend the Excreſcence till you break its Root, and then extract it. If the *Polypus* hangs down behind the *Uvula* in the Fauces, if you cannot take hold of it with the Pliers, and extirpate it with the Sciſſars, in the Method be-

When, and how to remove a Polypus by Evulſion.

fore propoſed by Mesue, you have then no other Method but gently to twiſt and extract the *Polypus* as we before directed, either with the crooked Forceps in *Tab.* XIX. *Fig.* 11, or with the Stone-Forceps, *Tab.* XXVIII. *Fig.* 6. in performing which you muſt be very careful to avoid pinching or lacerating the *Uvula* at the ſame Time: though we are told that M. Petit cut off the *Velum palati* in two Places, that he might the better extract a very large and dangerous *Polypus*. See Garengeot de Polyp. When you find a *Polypus* extending itſelf both into the Noſe and Fauces at the ſame Time, you are to remove the anterior Part of it firſt. See Le Dran, *Obſ.* VII.

How to ſuppreſs the Hæmorrhage.

IX. If the Flux of Blood is but gentle after removing the *Polypus*, the Surgeon may permit it to continue till it ceaſes of its own Accord, or ſuppreſs it by ſnuffing a Solution of Allum in red Wine up the Noſe. But when the Hæmorrhage is profuſe and dangerous, you uſe highly rectified *Sp. Vini*, or Vinegar, or ſome of the ſtyptic Liquors and Powders we have propoſed for the Bleeding of Wounds, which the Patient muſt draw up his Noſtrils: or you muſt fill his Noſe with Lint dipt therein, and formed into Doſſils, being firſt ſecured by a Thread whereby you may extract them. The laſt Method is your chief Refuge in very profuſe Hæmorrhages.

Le Dran's Method of ſtopping the Blood.

X. M. Le Dran, in *Obſ.* VI. propoſes a new Method of reſtraining the Flux of Blood in this Operation, by joining a dozen or fifteen Threads together in the ſame Manner as for a Seton, which he conveys through the Noſtril into the Fauces by the crooked Forceps, *Tab.* XIX. *Fig.* 11. He then extracts the End of the Thread hanging in the Fauces, through the Mouth, by a Pair of Pliers: and to this End he faſtens two thick Bundles of Lint *(Bourdonets)* the firſt dry, and the other dipt in ſome ſtyptic Liquor. After this he draws forward the Thread at the Noſe, which brings the Doſſils up into the Fauces and Back-part of the Noſtril, ſo that the firſt Doſſil of dry Lint clears the Blood from the Parts, and drives it forwards into the Noſe, while the other, armed with Styptic, faſtened about a Thumb's Breadth behind the former, exactly cloſes the Aperture of the Noſe into the Fauces. Thus the Blood is prevented from running into the Mouth, *Pharynx*, or *Larynx*, ſo as to relieve the Patient of his troubleſome Cough, and other Uneaſineſs it occaſions: and if the anterior Part of the Noſe is afterwards filled up with Lint dipt in ſome convenient Styptic or Liquor, upon reaching the broken Veſſels, they will be contracted, and the Hæmorrhage will conſequently ceaſe.

Other Methods of Removal.

XI. Albucasis, and others of the Ancients drew a Cord full of Knots through the Noſe, as we before obſerved, not ſo much to ſtop the Blood, as to remove the Remains of the *Polypus*: they took the Cord by its two Extremities, and drew it upwards and downwards, alternately, till they thought all the Remains were cleared away: and to ſucceed the better in their Intention, they ſometimes dipt the knotted Cord in *Ung. Ægyptiac.* And though this Practice of the Ancients is rejected as cruel and frightful by Aquapendens and others, yet we find it lately renewed by M. Le Dran, in a Caſe where the Root of the *Polypus* adhering to the Back-part of the Noſe above the Palate, and behind the *Vomer*, could be removed by no other Method. He therefore conveyed his Seton Ligature through the Noſe in the Manner before deſcribed, but without arming it with Knots, as the Ancients did, and for about twenty Days he continued to dreſs by his Ligature with Digeſtives, and then with

Deficcatives: by which Means he cured the Patient within the Space of a Month. See his *Obs.* VI.

XII. M. GARENGEOT, and some others, propose to lay open the Nose by Incision with a Scalpel, in order to extirpate such *Polypuses* as have their Roots seated in some otherwise inaccessible Part of this Organ, which is a Practice also recommended formerly by HIPPOCRATES and GUIDO DE CAULIACO. After this they cauterize the Root of the Excrescence. Which Method was also proposed formerly by CELSUS for an *Ozæna*. But for my own Part I should rather dissuade from this Practice, even in those Cases in which it might be performed, because of the great Pain, with the unsightly Cicatrix which attends it: and the rather, because when you have laid open the Nose, the *Polypus* cannot be very often removed, so as not to sprout up again; as I myself have known an Instance, as it is remarked by HUTTER of *Norimbergh*, in *Obs.* 50. of his Chirurgical Observations. However, when the Surgeon shall think it necessary to dilate the Cavity of the Nostrils by Incision, it will be proper to make your Incision in the Sulcus of the Nose next the Cheek, in order to render the Cicatrix less disfiguring. Apertion of the Nose by Incision.

XIII. In order to heal the Wound, and prevent the Return of the *Polypus*, it will be convenient for the Patient to snuff up his Nose a Mixture of *Sp. Vini cum Mell. Rosar. & Aq. Calc. portiuncula*, or to inject the same by a Syringe, or else to fill the Cavity of the Nose with Lint dipt in it, which Treatment is to be continued for several Days. But if we can perceive any Part of the *Polypus* remaining, it must be removed either by the Scissars, or else taken down with *Ung. Ægypt.* mixed with the preceding Injection: and, in some Cases, you may touch it now and then with *Lap. infern.* where that may be done with Safety, filling the Cavity of the Nose with Lint, so as to compress the circumjacent Parts, and prevent the the sprouting up of a new *Polypus*. In the mean Time the Patient should be kept under a proper Regimen in Diet, and supplied with convenient internal Medicines to correct the State of his Juices; particularly bleeding, purging, Mercurials, and a Decoction of the Woods ought not to be neglected. Cure of the Wound.

XIV. When the *Polypus* inclines to be cancerous, it will neither be convenient to irritate it with Instruments or Medicines: it should be rather palliated and prevented from inducing worse Consequences, by ordering a proper Diet, and Course of internal Medicines, as we proposed in Part I. Book IV. Chap. XVI. N° VI. and Chap. XVII. N° XI. Lastly, when a *Sarcoma* is found in the Cavity of the Nose, it is to be treated in the Manner we have here directed for a *Polypus*, taking in the Assistance of internal Medicines at the same Time. But if all these Means prove ineffectual, the Disorder is to be relinquished as incurable, especially when it proceeds from an obstinate *Spina Ventosa*. You will meet with various Observations from Authors on this Disorder collected by GLANDORPIUS, in his Treatise on the Subject, with two considerable Observations in LE DRAN, *Obs.* VI. and VII. Cancerous Polypi and Sarcomata.

CHAP.

CHAP. LXXII.

Of an Ozæna.

An Ozæna described.

THE internal Surface of the Noſe is ſometimes ulcerated, and diſcharges a corrupt Matter with Bits of carious Bones, and a very fetid Smell. This Diſorder is uſually denominated an *Ozæna*, or foul and malignant Ulcer of the Noſe, which is eaſily diſtinguiſhable by its *Fœtor* from thoſe ſlight Ulcerations of this Part, that proceed from a Defluxion of Humours, or the Inclemency of the Air, and are eaſily cured with a little *Ung. Ceruſ.* An *Ozæna* is uſually the moſt obſtinate and malignant, when accompanied with a Caries in the Bones of the Noſe. For tho' in the Beginning of the Diſorder the Ulceration affects only the internal Membranes, yet by Degrees it extends itſelf into the ſlender Bones of the Noſe, and frequently into the Sinuſes of the *Cranium* and *Oſſa maxillaria*, producing an incorrigible Caries.

Cauſes of the Diſorder.

II. An *Ozæna* generally proceeds from an inveterate Catarrh, or ſome other Diſorder in the Noſe; eſpecially when the Patient's Blood is at the ſame Time affected with the Scurvy, or venereal Diſeaſe. But it may ſometimes proceed from acrimonious or cauſtic Subſtances drawn into the Noſe together with the Air; ſometimes it alſo proceeds from, or is joined with, a *Polypus* in this Part, which I have ſeen myſelf: it is mentioned alſo by GLANDORPIUS de Polyp.

Diagnoſis and Prognoſis.

III. The Signs of an *Ozæna*, by which it may be diſcovered, are chiefly thoſe at N° I. preceding. But for the Event of it, it is to be obſerved as one of thoſe Diſorders which admit of a Cure with great Difficulty; becauſe the Bones of the Noſe, eſpecially the *Oſſa ſpongioſa*, in which it is ſeated, are not only of a ſlight Texture, but are alſo not within the Sight or Reach of the Surgeon's Inſtruments, to be thereby properly dreſſed and cleanſed. On this Account the Diſorder the ſooner ſpreads itſelf, and at length deſtroys not only the *Septum*, and other thin Bones within the Noſe, but alſo at length eats away the Cartilages, or external Noſe, ſo as greatly to disfigure the Patient, and impede his Reſpiration and Speech.

Cure by Internals.

IV. To cure this Diſorder, you ought therefore to have immediate Recourſe to Medicines both external and internal; eſpecially the laſt, which ſhould be ſuch as correct the Blood, and rectify a depraved Habit of Body, often termed *Antivenereals*, of which Mercurials, and Decoctions of the Woods, are the chief. The Patients Diet ſhould in the mean Time be ſpare and light, and without ſeaſoning; and, when the Caſe is venereal, nothing proves ſo effectual as a Salivation.

Cure by Externals.

V. Externally you muſt apply ſuch Topicals as are uſually preſcribed to deterge Ulcers; chiefly ſuch as the *Aq. virid.* HARTMANNI ſnuffed or injected every Day up the Noſe, or applied with Tents or Linnen-rags rolled up. I have ſometimes uſed a Mixture of *Aq. calc. cum Merc. dulc.* with good Succeſs. MAYERN and FALLOPIUS extol mild *Aq. aluminoſa*; which, according to FALLOPIUS, is thus prepared:

℞ *Aq. Plantag. & roſar. ana* ℔ ß.
Alum. & Mercur. ſublimat. ana ʒj. *m.*

You

You will alſo find great Benefit, in the worſt Kind of the Diſorder, from a Decoction of *Savin* and *Scordium*, in a Pound of which you are to diſſolve about an Ounce of the *Ung. fuſc. Wurtzii*; or an Injection of *Sp. Vini cum Mell. Roſar. & Ung. Ægyptiac. aut fuſc. Wurtz.* uſed warm. Others again extol the Uſe of Tents ſpread with the *Ung. fuſc. Wurtz.* mixed with a little *Vitriol. alb.* to be inſerted into the Noſe, till the Ulcer is cleanſed, and its Stench removed. Laſtly, fumigating the internal Parts of the Noſe with *Cinnabar* caſt upon a hot Iron, or live Coals, will very often conduce greatly to the Cure of an *Ozæna*; in the Uſe of which Medicines you are to continue at leaſt till the Stench and Diſcharge of corrupt Matter ceaſe. This Fumigation is recommended by MAYERN not only in the *Ozæna*, but in all obſtinate Ulcers of the Jaws and Palate, injected at the Mouth cautiouſly, and in ſmall Quantities.

Cure of an Ozæna with Caries.

VI. When the *Ozæna* is accompanied with a Caries, the Diſorder is hardly curable before you have obtained a Separation of the carious Bone, which is the chief Step towards the Cure of this Species of the *Ozæna*. And here Nature is the principal Performer. But in what Manner we are to extirpate a carious Part of the *Oſſa ſpongioſa* in the Noſe, Surgeons have not yet been able to inform us, ſince neither Cautery nor Cauſtic, nor any thing ſtronger than the Medicines before preſcribed, can be ſafely uſed in this Organ. In the mean Time the Surgeon muſt endeavour to deterge the Parts, and do what he can by the Uſe of thoſe Remedies continued for ſome Weeks or Months, till the carious Bone is caſt off; which, when looſe, may be extracted before that Time by a Pair of Pliers, to prevent the Caries from ſpreading into the Parts in Contact. But if the carious Bone proves too large to be thus conveniently extracted entire, it may be firſt divided with a Pair of Sciſſars, as I have ſometimes done myſelf; after which you muſt perſiſt in the above mentioned Remedies till the corrupt Parts are deterged, and the *Fœtor* removed.

DRAKE's Method for the Ozæna in Antro.

VII. We meet with a new Method of treating a particular Species of the *Ozæna* deſcribed in the Anatomy of Dr. DRAKE; in which the Ulcer is ſeated in the *Antrum Highmorianum*, or Sinus of the upper Jaw, diſcovering itſelf chiefly by the diſagreeable Smell and corrupt Matter, which runs out of the Noſe upon inclining the Head on the ſound Side, becauſe in that Poſture the Matter is turned out of the *maxillary Sinus*. But as we are not able by this, or any other Means, to clear the Matter from the Sinus, this Species of the Diſorder frequently remains incurable, and at length deſtroys the Patient: for whoſe Relief Dr. DRAKE[a] has ſupplied us not only with a true Notion of the Diſorder, but alſo with a new Method of curing it as follows: Being aſſured that the *Ozæna* is fixed in the *Antrum*, he orders one of the molar Teeth of the affected Side to be extracted, and then to break through the Socket, into the Sinus by a Probe, or other ſharp-pointed Inſtrument, like that repreſented in *Tab.* VII. *Fig.* 2. which, he ſays, may be generally performed without much Difficulty, becauſe this Part of the Bone is uſually much decayed or eroded by the retained Matter. Having thus made an Opening into the *Sinus*, you have not only a ready Diſcharge of the Offending Matter, but may alſo afterwards deterge

[a] This Method of treating an *Ozæna*, with ſeveral other Caſes in DRAKE's *Anatomy*, are ſaid to have been inſerted by the celebrated Anatomiſt and Surgeon Mr. COWPER; but how juſtly, I muſt leave others to determine.

and heal the Parts affected, by throwing in proper Injections, compoſed of *Elix. prop. vel Tinct. Myrrh. & Alo.* either alone or mixed with a Decoction of *Scordium* or *Savin*, with ſome *Mel. Roſar.* After your Medicine is injected into the *Sinus*, you muſt retain it there ſome Time, by immediately ſtopping up the Aperture in the Gums by a Tent; after removing which, and diſcharging the Injection, you muſt inſert another Tent faſtened to a Thread, and intended to keep the Paſſage from cloſing up before the Ulcer is deterged and healed in the *Antrum.* The Succeſs of this Practice is confirmed by repeated Experience: and it is remarkable, that the upper Jaw-Bone is ſometimes ſo much eroded by the confined Matter, that a great Part of it comes away together with the Tooth extracted. So that you need not make any Aperture into the *Sinus*, that being, by this Means, already performed to your Hand: and you have nothing more to do, than treat the Ulcer with Detergents and Balſamics to compleat the Cure. See Celsus on *Ozænas* and ulcerated Noſes.

CHAP. LXXIII.

Of Artificial Noſes.

WE have already directed in what Manner you are to replace and conjoin a Noſe which has been almoſt quite ſeparated from the Face by a Wound, Bite, or any ſharp Inſtrument, in Part I. Book I. Chap. XIII. N° VIII. but we have not yet acquainted you with the Method of cutting out a new Noſe from ſome fleſhy Part of the Body, and of conjoining it on the Face inſtead of the true Noſe, which was cut or torn off. Taliacotius has a profeſſed Treatiſe on the Subject, illuſtrated with many Figures, and entitled, *Chirurgia Curtorum per Inſitionem:* yet what is there propoſed by this Author, is, for want of later Experiments and Obſervations, judged to be impracticable, and without Foundation, by our modern Surgeons. When this Member is loſt, we muſt ſupply its Defect with an artificial Noſe of Wood or Silver, unleſs, by being on the Spot, you can inſtantly replace and conjoin the real Noſe juſt ſeparated, either by Suture or Plaſters. Such an artificial Noſe, painted to the Life, and adapted by proper Springs and Screws, may render the Accident and Deformity imperceptible. Roonhuys, *Obſ. Chirurg.* XXIV. gives an Inſtance of a Noſe ſlit down longitudinally, and cured by Suture. M. Blegny in *Zod. Med. Gall.* An. 1680. ſpeaks of a Soldier, whoſe Noſe was cut quite off by a Scymetar, and ſewed on again afterwards ſo well by the Surgeon, that you could ſcarce perceive the Scar. And M. Garengeot, in Tom. III. of his *Surgery*, Pag. 55. Chap. *On a* Polypus, gives an Account of a Noſe that was conjoined again by Suture, after it was bit off.

CHAP.

CHAP. LXXIV.

Of Opening the Noſtrils preternaturally cloſed.

I. I Do not remember to have ever met with an Inſtance in Chirurgical Writers, of the Noſtrils being preternaturally cloſed or concreted, and afterwards rectified by Surgery, except only in BARTHOLIN. *Act. Hafn.* Vol. I. Pag. 199. But that ſuch Caſes do ſometimes happen, and that they are curable by the Hands and Inſtruments, is apparent from the following Account. A poor Infant was brought to me at *Helmſtadt*, *Anno* 1721, of about three Years old, who, for want of Care and proper Attendance in the Small Pox, a Misfortune to which many poor People are liable, had been grievouſly ulcerated all over its Face, and more particularly in its Noſe and Lips, whereby the Noſtrils were collapſed or cloſed, and concreted ſo ſtrongly to the upper Lip which turned back, that there was no Poſſibility of ſhutting the Mouth, as in *Tab.* XIX. *Fig.* 14. AA. The right Noſtril was totally occluded, and the left ſo contracted and cloſed, that it would not admit the Head of a ſmall Pin: whence the Infant was often troubled with ſuch a difficult Reſpiration in Sleep, that the Parents were afraid every Moment that it would be ſuffocated. Nature of the Diſorder.

II. In this Caſe I proceeded as follows: having placed its Head againſt the Light, and ordered its Hands and Legs to be held by an Aſſiſtant, I firſt ſeparated the upper Lip from the right Side of the Noſe by the Scalpel, and then with a ſmaller Scalpel I made an Opening through both the right and left Noſtril, almoſt as large as the natural. I next examined the State of the Parts within the Noſe by the Probe, *Tab.* I. *Fig.* K, and farther enlarged the Openings, and freed the Parts by the Scalpel, according as I found neceſſary. After having in this Manner opened the Noſtrils, when they had bled a while, I inſerted a pretty thick Tent of Linen into each, which both reſtrained the Hæmorrhage, and kept the Aperture from cloſing at the ſame Time. This done, in order to reſtore the upper Lip to its former and natural Poſition, I placed a Doſſil of Lint with a Plaſter, and an oblong narrow Compreſs at the Bottom of the Noſe to depreſs the Lip, and then ſecured the whole Dreſſings by the Sling with four Heads, applied in the ſame Manner as for the Hare-lip. This Method of Dreſſing was continued for ſeveral Days, only the naſal Tents were uſually dipt in *Sp. Vini:* by which Means I reſtored both Lip and Noſtrils to their Healthy State within eight Days time. Method of Cure.

III. When the Infant appeared almoſt well, the negligent poor Mother removed the Tents from the Noſtrils, and did not bring it, as uſual, for me to renew the Dreſſings; in conſequence of which the Noſtrils again collapſed and coaleſced, ſo as ſcarcely to admit a ſlender Probe. The Mother now therefore acknowledges her Fault, and implores my Aſſiſtance a ſecond Time: whereupon I opened the Noſtrils by the Scalpel, as before, and, inſtead of the Tents, introduced two leaden Pipes contrived for this Purpoſe (*Tab.* XIX. *Fig.* 15 and 16.) with which both the Noſtrils were kept open, and of their proper Dimenſion, till the Wound was completely healed and cicatrized. A ſecond Method.

Other Inſtances.

IV. I performed another Cure of this kind upon a little Girl belonging to a Peaſant, in the Year 1725, whoſe Diſorder ariſing in like Manner after the Small Pox, I treated it in the ſame Method. I have ſince had a third Child brought to me at *Helmſtadt*, afflicted with the ſame Accident; in the Cure of which I ſubſtituted Braſs Tubes for thoſe of Lead, which are eaſily compreſſed and deformed. In the Cure of this Diſorder, Care muſt be taken to dilate and keep open the Noſtrils for a conſiderable Time, even till after the Wound is cicatrized; otherwiſe, if you remove them too early, the Noſtrils will be ſurprizingly contracted, though they appeared very large, and ſufficiently dilated before.

An Explanation *of the* Nineteenth Plate.

Fig. 1. Is a Steel Inſtrument, with its Tube, to cauteriſe behind the *Antitragus* of the Ear for the Tooth-ach. A the Tube, B its Handle, C the Cautery appearing through the Tube, D the Handle.

Fig. 2. Repreſents an acouſtic Inſtrument, to help thoſe who are hard of Hearing, made in the Shape of a Horn or Trumpet; the ſmall End A being inſerted into the Ear, the broad End BB receives, collects, and concentrates the Sound, ſo as greatly to augment the Hearing.

Fig. 3. Is another Inſtrument for the ſame Uſe, having its Tube convoluted.

Fig. 4. Repreſents Dekkers's acouſtic Inſtrument made of Silver: A the turbinated or Shell-part of this is applied to the Ear, round which it is faſtened under the Wig or Hair by the Strings BB, without either being ſeen, or the Trouble of holding it in your Hand.

Fig. 5. Is an Inſtrument to hold the Lobes of the Ears with in boring them.

Fig. 6. Denotes a Needle of Silver or Steel, ſharp-pointed at one End A, and hollow at the other End B, that it may both perforate the Lobe of the Ear, and introduce the leaden Plummit, *Fig.* 7. at the ſame Time.

Fig. 8. Is another Needle for the ſame Purpoſe, but ſlit at one End like a larding Needle, that it may introduce the leaden Plummit, *Fig.* 7.

Fig. 9. Repreſents a Pair of arched *Forceps*, from Palfin, for extracting a *Polypus* of the Noſe.

Fig. 10. A Pair of Pliers for the ſame Uſe, but perforated at their Ends, that they may hold the *Polypus* more firmly.

Fig. 11. Denotes another Pair of Pliers, perforated at their Ends like the former, but made a little crooked, that they may twiſt off and extract *Polypuſes* growing in the *Fauces*, and poſterior Part of the Noſe.

Fig. 12. Is an Inſtrument I contrived to paſs a String round the Root of a *Polypus*, to remove it by Ligature, according to Chap. LXXI. N° VII.

Fig. 13. Repreſents the *Polypus* I removed by a Ligature, made with the preceding Inſtrument, *Fig.* 12. A the Root which grew to the Middle of the external Side of the right Noſtril, B the Extremity of it which appeared out at the Noſe.

Fig. 14. Denotes Part of the Face, in which the Noſtrils were concreted, and the upper Lip turned back, and joined to the Noſe.

Fig. 15. and 16. Repreſent two Pipes of Lead or Braſs, furniſhed with Wings, to dilate and keep open the Noſtrils, *Fig.* 15 for the right, and 16 for the left, in the Cure of the diſordered Face, *Fig.* 14.

Of

Fig. 1.
C
A
D
Fig. 2.
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B
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Fig. 3.
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Fig. 4
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Fig. 6.
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Fig. 7.
Fig. 8.
Fig. 11.
Fig. 5.
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Fig. 10.
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Fig. 15.
Fig. 16.
Fig. 14.
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Fig. 13.
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Fig. 9.
Fig. 12.
B
C
A

J. Mynde sc.

Of Chirurgical Operations on the Lips.

CHAP. LXXV.

Of the Hare-Lip.

I. IN ſome People we obſerve the upper Lip in a Manner ſlit or divided [a], ſo as to reſemble the upper Lip of a Hare, as in *Tab.* XX. *Fig.* 1. of which kind I lately obſerved and cured one: This Diſorder is therefore called the Hare-lip from its Similitude to the ſame Part in that Animal. Sometimes the Diviſion is ſo large, that one would imagine Part of the Lip to be wanting; and ſometimes again the Fiſſure or Diviſion is double, ſo as to reſemble the Letter M, and then the Patient is ſaid to have a double Hare-Lip. In Infants this Diſorder obſtructs their Sucking, as it does the Speech in Adults. Sometimes a like Fiſſure is obſerved in the lower Lip, from a Wound which has been neglected, or improperly treated: and this laſt Species of the Diſorder is termed the ſpurious Hare-Lip. In the true Kind, which is born with the Infant, the Palate itſelf is often divided either in Part, or all along to the Noſe and *Uvula*, which laſt Part I have frequently obſerved to be wanting. Hence, when the external Hare-Lip has been cured, the internal Fiſſure of the Palate remains incurable notwithſtanding, which greatly impedes and vitiates the Formation of the Voice and Speech. The leſs and more equal the Fiſſure of the external Hair-Lip is, it is generally ſo much the more eaſy to be cured; and the more difficult, as it is larger and more unequal. In ſome Infants the Diviſion of their Lip is ſo large and irregular, that one can have little Hopes of a Cure, which may however be very eaſily performed on the very ſame Lip, when adult. So alſo the double Hare-Lip is very difficult to cure, from the Largeneſs of the Fiſſure, and other Circumſtances. Sometimes too we meet with a Tooth, or Part of the lower Jaw projecting forward into the Fiſſure, which cannot be cured, unleſs they are firſt removed. Deſcription.

II. In a recent Hair-Lip, or one which is made by a Wound, you muſt attempt the Cure by the knotted Suture, as we directed in Wounds. But when Part of the Lip is wanting, your Operation muſt be made with Needles, as in the true Hair-Lip. In this Operation therefore we do not attempt to ſupply any Part that is wanting, but only to unite thoſe which are divided, which cannot be performed without ſcarifying, and taking off the Skin from the Edges of the Fiſſure, the Performance of which requires great Circumſpection: and therefore we ſhall briefly and plainly deſcribe the beſt Method of performing this Operation. And firſt in regard to the Seaſon, you ſhould chuſe the temperate one of the Spring or Autumn, but rather the firſt, obſerving that your Patient is not troubled with any other Diſorder at the ſame Time: and if The Operation.

[a] In M. GARENGEOT's Figure you cannot perceive any Fiſſure or Diviſion in the Lip, but it appears entire.

he is, to remove that Diſorder firſt. In the next Place, your Patient is to be prepared by a proper Diet, and the Uſe of lenient Purges, continued for ſome Time before the Operation, which muſt be performed in a light Apartment, and will require the following *Apparatus:* a Pair of Sciſſars, *Tab.* I. *Lit.* C. and ſome Needles, *Tab.* IV. *Fig.* 21, 22. or *Tab.* XX. *Fig.* 2, 3, 4, 5, made of Gold, Silver, or Braſs, provided they are triangular, and ſufficiently ſharp at the Point, as at *Fig.* 2. or elſe flat, as at *Fig.* 3, 4, 5, that they may more eaſily enter through the Lips. Steel Needles are leſs convenient, becauſe they ruſt, and cannot be eaſily extracted without cauſing Pain and Laceration. You muſt alſo provide ſome ſtrong Silk, a Veſſel full of warm Water, with a Sponge, ſome Lint, Balſam, and a Fillet: or if Part of the Jaw or a Tooth protrudes itſelf, you muſt then add a ſuitable Pair of *Forceps* for their Removal. Laſtly, you muſt not want *Hungary* Water, or ſome other Cordial, to recover or chear up the Patient: all which being provided in order, you may then proceed on the Operation as follows. If the Patient be an Adult, he muſt be ſeated againſt the Light, with his Head ſecured by an Aſſiſtant: but if it be an Infant, upon whom this Operation is moſt frequently performed, it muſt be laid upon the Lap of a ſtrong Man, with the Hands and Feet ſecured, each by an Aſſiſtant. When the Fiſſure appears large or deep, ſo that the two Parts of the Lip cannot be eaſily conjoined, it will be neceſſary firſt to divide the *Frenulum* of the upper Lip from the Gums with a Pair of Sciſſars, but without wounding the Gums, or uncovering the Jaw. The Operator now removes the external Skin of the Fiſſure with the Sciſſars, taking it off very cleanly, eſpecially in the upper Part, without which they will not intimately unite. The raw Lips are now cleanſed with a Sponge, and then held cloſe together by an Aſſiſtant, while the Surgeon paſſes through them one, two, or three Needles, according to the Age or Size of the Patient; ſo that they may enter and come out of the Lips at about the Diſtance of a Gooſe-Quill from the Fiſſure: for when they are paſſed through nearer to the Fiſſure, they do not hold ſtrong enough, but will tear out, eſpecially in Infants who are apt to cry. The Needles are to be entered from the right towards the left, beginning with the firſt at the upper Part of the Fiſſure, and inſerting them at about a Straw's Breadth from each other. But in paſſing the Needles through the Lips of Adults, which are often very compact, you may ſometimes have Occaſion for a Needle-Caſe, *Tab.* VI. *Fig.* 2, 3. to ſuſtain the Lips of the Wound againſt the Point of the Needle: though this may be generally done by the Fingers, which is my conſtant Practice.

Ligation of the Thread.

III. Having thus entered your Needles, and cleanſed the bleeding Lips with a Sponge, you then take a Piece of ſtrong Thread or Silk waxed, and, faſtening it about one End of the Needle, you proceed with it either circularly, or like the Figure ∞, as in *Tab.* IV. *Fig.* 21, 22, *Tab.* XX. *Fig.* 5. by which Means the Margin of the Lips are brought cloſe together, and the Thread at laſt ſecured by a Knot. It is now the Practice of ſome to break off the Points of the Needles with a Pair of Pliers, that they may not project above the Breadth of a Gooſe Quill beyond the Ligature ſo as to prick the Lip, and produce Pain and Inflammation. But this is not neceſſary when the Needles are ſhort, or when they are ſecured with a Piece of Rag or Sponge; but

but, on the contrary, the Cure generally ſucceeds better in this Manner, without being attended with any bad Accidents, from the Irritation of the Wound.

IV. Your Dreſſing muſt now be made with ſoft Lint dipt in *Mel. Roſar.* and applied according to the common Method, betwixt the Gums and Lip, to heal the Wound internally: which Practice may be followed well enough in Adults, but not in Infants. For in the firſt Place theſe tender Patients won't eaſily admit of ſuch Applications: and by their Reſiſtance and Cries the Lips of the Wound will be torn aſunder. Beſides, there is great Danger of the Lint dropping from the Gums and falling into the Throat; which may bring on violent Coughings, Vomitings, and ſometimes Suffocation: for which Reaſons I would by all Means omit it. The external Part of the Wound is at the ſame Time dreſſed with *Balſ. Peruv.* or ſome other vulnerary Unguent, covered with Lint and a Compreſs, and, if you pleaſe, a ſticking Plaſter with four Heads, as in *Tab.* II. *Fig. d*; two of which are faſtened upon the left Side of the Lip, and two on the right, the whole being ſecured by a Sling with four Heads, or a Simple Fillet with two Heads, whoſe Extremities may be faſtened about the Head either by a Knot or Pins. Some Surgeons indeed uſe the uniting Bandage, *Tab.* II. *Fig. f*, to conjoin the Parts of the Hare-Lip, after they have been dreſſed with a Plaſter. But this, I think, will do more Harm than Good, by preſſing the Needles too forcibly: and as nothing more is required than barely to keep the Dreſſings on the Wound, the firſt mentioned Bandage will anſwer the Intention very well. GARENGEOT adviſes to bleed the Patient two or three Times after the Operation: but no Reaſon being offered for this Practice, I think it may be better omitted, as I have always done, and yet not without Succeſs. Dreſſings.

V. It has been an Opinion of the Ancients, that it is not ſafe to perform the Operation for a Hare-Lip upon Infants, before they are two Years of Age, or even till they are four or five, according to GARENGEOT. The contrary of which is taught by Experience, from whence we are furniſhed with Inſtances of Infants happily cured of a Hare-Lip, when they have not been above five or ſix, or even three Months old, if they are well in other Reſpects, and the Operation rightly performed. Beſides, Parents are ſeldom willing to defer the Operation ſo long: And I have known them ſo uneaſy on this Account that they would rather employ an itinerant Quack in the Operation, than poſtpone it for any Time: nor indeed have theſe Mountebanks often miſcarried. It is diſagreeable to Parents in general, that their Children ſhould appear with ſuch a Blemiſh: and it is often of bad Conſequence to the Mother in ſucceeding Pregnancies to have ſuch Objects in their Preſence; by which Means the Deformity is propagated in the Family. Therefore I would adviſe expert Surgeons not to be afraid of performing this Operation too early, eſpecially when the Fiſſure is but ſmall. It is alſo a neceſſary Circumſtance in Infants, to keep them from ſleeping a conſiderable Time before the Operation; and afterwards to give them an Anodyne, that they may ſleep the beter, and lie ſtill the longer after the Operationt without moving the Lips by crying. It ſhould alſo be obſerved, rather to let the Infant lie with its Face downward during the Operation, that the Blood may not run down its Throat, and ſet it a coughing. And though the Hæmorrhage is often pretty plentiful in performing this Operation in young Infants, yet no Danger can be well expected from thence: Whether Infants are thus curable.

thence: for it rather prevents Inflammation, and generally ceaſes after applying the Bandage and Dreſſing upon the Lip.

Some uſe Tenacula.

VI. But to leſſen the Hæmorrhage, and proceed more conveniently in this Operation, ſome Surgeons think it neceſſary to be furniſhed with ſome *Tenacula*, to hold the Lip on each Side the Fiſſure, before you remove the Skin by the Scalpel or Sciſſars, ſee *Tab.* XX. *Fig.* 6, 7. which though they ſeem adapted to make a neater Wound and *Cicatrix*, yet they are ſcarcely ever uſed. In Infants who have a Fiſſure in the Palate, and in thoſe who are more adult, there is frequently a Protuberance of the upper Jaw, or elſe a large Tooth ſtarts forward through the Fiſſure, and which muſt therefore be either extracted or removed before the Operation.

What is to be obſerved in renewing the Dreſſings.

VII. The Dreſſings ought not to be removed before the third Day, unleſs it be required by ſome Accident, and then they muſt be taken off cautiouſly, to avoid ſeparating the Parts in Contact. In the mean Time the Part ſhould be anointed with Syrup of Violets, or Honey of Roſes: and, if the Dreſſings adhere, they ſhould be firſt moiſtened with warm Wine; and when the Thread appears relaxed, ſo as not to retain the Lips of the Wound cloſe together, a new Thread ſhould be faſtened round the Needles, to conjoin them more cloſely. But when every thing ſucceeds well, the Operator has little more to do than to dreſs with ſome vulnerary Balſam. If the Lips of the Wound appear conjoined three or four Days after the Operation, you may then venture to extract the middle Needle when there are three, or the upper one when there are two only. By which Means the Threads will ſeparate freely of themſelves; and the Cure may be completed by dreſſing every Day with *Mel. Roſar.* or ſome vulnerary Balſam, with a ſticking Plaſter and uniting Bandage. Laſtly, to facilitate and promote the Cure, the Patient ought to be dieted upon Broths, Emulſions, Milk, Jellies, and ſuch like Subſtances, which do not require any Maſtication, and to reſtrain from loud Talking. In young Infants moiſten the Bottom of the Lip with a Feather dipt in *Mel. Roſar. vel Syr. Violar.* which will both heal and excite the Infant to lick that Part, and promote the Cure.

Method uſed by Mountebanks.

VIII. Many *German* Quacks and Mountebanks frequently retain the Lips of the Wound together by ſtrong Thread paſſed through them inſtead of Needles, after which they tie the Ends of the Thread in the ſame Manner as we directed for the knotted Suture in Part I. Book I. Chap. VI. N° III. They obſerve the ſame Order in tying the Threads as other Surgeons do in making the Ligature about the Needles, making no Difference in their other Dreſſings, and the Remainder of the Cure: at laſt they cut the middle Thread on the third or fourth Day, as they do the uppermoſt upon the fifth, and the lowermoſt on the ſixth or ſeventh Day; and thus they frequently ſucceed, (as WEDELIUS and myſelf have often obſerved) and perform good Cures, though in an awkward Manner, and by obtuſe and unfit Inſtruments, eſpecially when then Fiſſure is but ſmall; for when it is large, this Method will hardly ſucceed.

Cautions and Obſervations.

IX. We ſhall now ſubjoin a few neceſſary Cautions and Obſervations concerning this Diſorder. As, 1. When the Skin in the upper Angle of the Fiſſure is not clean cut out, that Part will not unite, though it may be conſolidated below, ſo that it will form a Sort of an *Hiatus* or *Foramen*: to prevent which it will be proper to leave none of the Skin behind. 2. If by neglecting this Caution

tion a *Foramen* ſhould be left above, when the Parts are healed below, there is no better Method of curing it than by cutting out the *Cicatrix* entirely by a double Inciſion, cloſing the Wound afterwards with a Needle and Ligature. In this Manner I cured two young Girls of ſuch an *Hiatus*, which had been left in the Lip after the Cure by the Operation performed by Mountebanks. 3. When the Palate is alſo ſlit, and the Fiſſure of the Lip extends itſelf into the Noſe, as in *Tab.* XX. *Fig.* 1. the forementioned Cautions are ſuperfluous. 4. In the double Hair-Lip the four Sides of the Fiſſure are to be cut off, and then conjoined by long Needles and Ligature. 5. Some direct, with PALFYN and ROONHUYS to looſen the Threads about the Needles on the ſecond or third Day; but as thoſe Threads uſually adhere to each other, and to the Wound or Needles, by Means of the Blood or Balſam, they cannot be removed without Pain and Injury to the Patients, eſpecially Infants and Children: and therefore I ſhould adviſe you to omit removing the Threads till they ſeparate of themſelves after extracting the Needles; except ſome Inflammation, or other Accident, ſhould require it. 6. I ſometimes uſe a Sling with two or three Hooks, as in *Tab.* IV. *Fig.* 4. which being fixed round the Head, and upon the Corners of the Lips, they are by this Means drawn backward. In the next Place, after the Needles are encompaſſed with the Thread, I then faſten another ſtrong Thread to the Hook on each Side, and paſſing them round the Needles, make an Extenſion towards each Side of the Mouth, by which Means the Lips of the Wound are better ſecured than in any other Method. 7. Some direct to ſupport and extend the Lip with one Hand, while you cut off the Skin by the Sciſſars with the other; but as in this Method, the lower Part of the Lip will be more tenſe than the other, it will be more liable to the Inciſion, ſo as to make the Wound too large and unequal; and therefore I think it better not to touch the Lip with you Fingers, but only to remove the Margin of it by the Sciſſars. 8. M. PETIT has invented a Needle for this Operation almoſt like the larding Needle uſed in Kitchens, *Tab.* XX. *Fig.* 8. By whoſe obtuſe End being ſlit A. and paſſed through the Lips of the Wound, he introduces the *Fibula*, *Fig.* 9. made of Silver with two Heads, which is left in the Wound after the Needle is extracted: and then he ties round the Thread about the *Fibulæ* inſtead of the Needles, to conjoin the bleeding Lips; which Method I have known to anſwer very well. But I uſe Silver *Fibulæ* made each, either with none, or but one Head, as that at *Fig.* 10. that they might be more eaſily extracted; for thoſe Heads muſt cauſe Reſiſtance againſt the Parts. I alſo think his Needles are too large and thick, and ſhould therefore rather approve of thoſe *Tab.* XIX. *Fig.* 8. 9. If an Inflammation or Fever with Convulſions ſhould ſupervene after the Operation; I muſt adviſe you, with M. GARENGEOT, to remove the *Apparatus*. 10. But when a large Part of the Lip, or Teeth are wanting in Adults, ſo as not to be able to ſupport the *Fibula*, you muſt then fix a Plate of Lead under the Lip. Laſtly, it is ſurprizing that HILCANUS ſhould have nothing upon the Hare-Lip among all his 600 *Chirurgical Obſervations*, which he has publiſhed.

CHAP.

CHAP. LXXVI.

Of a Cancer in the Mouth and Lips.

Deſcription. I. THERE are two Species of Cancers in the Lips, as in other Parts of the Body, *viz.* latent and ulcerated. By a latent Cancer is meant a hard, painful, and inflammatory Tumour in the Lip. The ulcerated Cancer is when the Tumour degenerates into a ſpreading fetid Ulcer, diſcharging an acrimonious offenſive Matter, which corrodes not only the Lips, but every Part of the Face it touches. This Species of the Cancer is generally ſeated in the lower Lip, as it is repreſented in *Tab.* XX. *Fig.* 21. *a a a.*

Cauſes. II. This lamentable Diſorder commonly ariſes, like other Cancers from a peculiar Acrimony in the Blood, and an Obſtruction of the ſpongy Glands in this Part; from whence proceeds a livid and painful Tumour or Wart, that by Degrees turns to an open Cancer or malignant Ulcer, which quickly divides the Lip as if it were ſlit, as at *Fig.* 11. This Diſorder may alſo frequently ariſe in bad Habits from an accidental Blow, Bite, or Puncture of the Lip, *&c.*

Prognoſis. III. The Uſe of Medicines in this Caſe is generally of little or no Service; and almoſt the only Relief that can be expected and hoped for muſt be had from the Knife. If this be not applied in Time, there will be great Danger of the Diſorder ſpreading itſelf into the other Glands of the Neck, Mouth and Fauces, ſo as to ſtrangle the unhappy Patient, as I have ſometimes obſerved. But when the vitiated Parts are timely removed, there may be then ſome Hopes of a Cure; eſpecially if the offending Humours in the Blood are at the ſame Time corrected, and carried off by a proper Diet and Medicines: which, being generally extremely difficult to obtain, is frequently the Cauſe of the Diſorder returning again ſoon after. However, the Diſorder is more likely to be cured in young than in old Patients, and in thoſe the moſt eaſily curable are ſuch as proceed from external Cauſes and moſt dangerous and obſtinate, when they owe their Riſe to an acrid and vitiated Blood.

Cure when from, 1. a Fiſſure. IV. The Cure of a Cancer in the Lips is to be performed in different Methods, according to the particular Condition of the Diſorder. For, 1. when only a ſmall Chop or Fiſſure infeſts the upper Part of the Lip like a painful and inflammatory Ulcuſcle, the Cauſe of the Diſorder being external, from cold, or the like, it may then be proper to treat it with *Mel. Roſar. Balſ. Peruv.* or *Ung. Saturnin. ſeu Diapomphol. cum Merc. pauxillo*, and afterwards to cover it with a Plate of Lead that has been rubbed with Mercury, or with a Piece of *Emplaſt. Diapalma* continued and renewed till the Diſorder diſappears. In the mean Time a proper Regimen, Diet, and Courſe of Medicines, ought not to be neglected. I have by Experience learned, that the Liquor expreſt from rotten Apples, and mixed with *Merc. dulc.* aſſiſted with internal Medicines, afforded great Relief to a certain young Woman troubled with this Diſorder. We alſo read of a Cancer in the Mouth cured by *Vitriol. cærul.* either with or without Olive Oil, *Ephem. nat. curioſ. Cent.* 6. *Obſ.* 43. But when neither theſe nor other Medicines afford any Relief, and we perceive the Diſorder growing daily worſe and worſe, the chief and only Remedy is to extirpate the indurated and cancerous Part of the Lip by two or three Inciſions with a Scalpel or Lancet,

obſerving rather to remove ſome of the ſound Parts, than to leave the leaſt Bit of the Cancer behind, which LE DRAN confirms: and then you may conjoin the Lips by two Needles or *Fibulæ*, like as in the Hare-lip; or when the Fiſſure is but ſmall, by the *Sutura nodoſa*. By this Method I ſucceeded in curing the Cancer repreſented in *Tab.* XX. *Fig.* 11.

2. From a Tubercle.

V. But when the Cancer of the Mouth is not yet ulcerated, but infeſts that Part of the Lip next the Skin with a very hard and painful Tumour, you are in that Caſe adviſed by ſome Phyſicians to remove it by Eſcharotics, healing up the Wound after the Tumour is deſtroyed. This Practice may indeed ſucceed ſometimes, when the Cancer proceeds only from external Cauſes, or an encyſted Tumour: but as the Application of Cauſtics is generally dangerous in theſe Cancers, I ſhould rather adviſe, with the moſt prudent Phyſicians, to extirpate the ſame by the Scalpel or Sciſſars. There are two Methods of amputating theſe Cancers, according to their particular Natures: for thoſe which are moveable, you are to make an Inciſion through the Skin with a Scalpel; and, after freeing the Tubercle from its Adheſions with the Knife or Sciſſars, the Wound is then to be healed in the uſual Manner. But ſuch as are fixed and immoveable are to be extirpated together with Part of the Lip in which they were contained, treating the Wound afterwards by Suture as in the Hare-Lip. But in whatever Method you proceed to cure the Patient, it will be all to no Purpoſe, if he does not obſerve a proper Regimen of Diet and Medicines, with Bleeding and lenient Purges, to prevent a ſpeedy Return of the Diſorder, which I have obſerved oftener in this Caſe than in a Cancer of the Breaſt. See SCULTETUS *Obſ.* 33. LE DRAN *Obſ.* IX, X, and XI. And GARENGEOT on the Cancer of the Lips. Tom. iii. Ch. 6.

Of Chirurgical Operations in the Teeth.

CHAP. LXXVII.

Of Opening the Teeth and Jaws which are clinched.

Cauſes.

I. IN ſome People the Jaws and Teeth are ſo cloſely and ſtrongly ſhut, that they cannot be ſufficiently ſeparated either to ſpeak or eat; generally ariſeing from a Spaſm or Cramp of the elevating Muſcles of the lower Jaw; whence it is alſo denominated a *Rigor* or *Spaſm* of the Jaw. The Cauſe of this Spaſm is not always the ſame; ſince it ariſes ſometimes from a Wound or Injury of the Nerves or Tendons in different Parts of the Body, or after the Amputation of an Arm or Leg, as I have frequently obſerved in Camps: but ſometimes again it may proceed from an Inflammation of the Muſcles and Parts of the Fauces and Jaw itſelf.

Cure. II. When the Diſorder proceeds from a Wound you ſhould examine whether there are any foreign Bodies concealed therein, ſo as to excite theſe and other Spaſms: upon removing which Bodies the Spaſms ceaſe immediately, though you could procure no Relief before by the beſt nervous Medicines. If no foreign Body lies concealed in the Wound, you may then reaſonably conclude the Spaſms to ariſe from an Injury of the Nerves or Tendons; as is ſufficiently apparent from what we have ſaid before of Wounds in the Nerves and Tendons in Part I. Chap. II. N° II. and III. Therefore you muſt have Recourſe to the Remedies we have there preſcribed: and, if they do not ſucceed, you muſt totally divide the wounded Nerve, if its Conſequence will not be fatal, after which you will preſently find theſe Spaſms and Convulſions diſappear. Sometimes the injured Nerve is inacceſſible, or cannot be divided without imminent Danger to the Patient's Life, which is a deplorable Caſe; but even here the Patient muſt either part with the Limb, if poſſible, or elſe continue in his convulſive Spaſms. Thoſe who are troubled with this Diſorder after the Amputation of an Arm or Leg, may indeed be much more eaſily cured of it; for in this Caſe the Spaſm will generally diſappear immediately without other Remedies, upon removing the Ligatures on the Veſſels, or the Vitriol, or other Cauſtic, applied to reſtrain the Hæmorrhage. Some again cannot be relieved of their Spaſms by any Means whatever, ſo that the Patient is inevitably obliged to periſh by them, as I have frequently obſerved. When an Inflammation of the Tonſils or Muſcles of the Jaw excite this Spaſm and clinching of the Teeth, you ought to treat the Patient only with Regard to his Inflammation, as in other febrile Diſorders: for this being removed as the Cauſe, the Spaſms will quickly diſappear as the Effects. But that the Patient may not be ſtarved for want of Aliment during his Diſorder, when it holds a conſiderable Time, he muſt be plentifully ſupplied with warm Broth, Egg-cordial made with Ale, Almond Milk, Gellies, and ſuch other fluid Nouriſhment, as may be eaſily drawn in betwixt his Teeth tho' ſhut: and, when you find it neceſſary, nouriſhing Clyſters may be alſo adminiſtred, compoſed of the ſame Subſtances.

Inſtruments. III. We are furniſhed with ſeveral Inſtruments for opening the Jaws, and ſeparating the Teeth in this Diſorder, termed by ſome *Specula oris*, as in *Tab.* XX. *Fig.* 12. by which the Mouth may be opened, in order to ſupply the Patient with Food and Medicines. But, in my Opinion, every prudent Surgeon will reject theſe Inſtruments as pernicious; for by the violent Diſtention of the convulſed Muſcles in opening the Mouth by this Inſtrument, the Pain, Inflammation and Spaſms are much more increaſed; that it will be better to ſupply the Patient with Suppings and fluid Aliments, which he may draw through his Teeth, as mentioned at N° II. My Opinion therefore is, that you ought not only to reject this Inſtrument, but alſo the Method propoſed by M. Dionis, who adviſes in this Caſe to break out a Tooth to ſupply the Patient with Broths and Medicines, when his Mouth cannot be ſufficiently opened by the Inſtrument. Yet I am far from condemning the Uſe of this Inſtrument for inſpecting the Mouth, in examining ſeveral Diſorders of its Parts, or in performing any Operation in the Palate, Tonſils, or Teeth; for in theſe Caſes I much approve of the *Speculum oris*, *Tab.* XX. *Fig.* 13. or ſome ſuch other Inſtrument.

CHAP.

CHAP. LXXVIII.

Of cleanſing black and foul Teeth.

I. AS the Teeth are frequently infeſted with a yellow, livid, or black Cruſt, it gives not only great Deformity to the Patient, but alſo infects his Breath, and looſens or decays the Teeth. We ſhall therefore here deſcribe the Methods of ſcouring the Teeth, and diſcharging their morbid Cruſt. For this Purpoſe we are furniſhed with various Inſtruments, which may be properly called *Scalpra dentalia*, *Tab.* XII. *Fig.* 14, 15, 16, 17. ſome of which are furniſhed with narrow Points, others with broader, and with Edges; and ſome again are falciform, as that at *Fig.* 17. But all of them are adapted to one and the ſame Handle, *Fig.* 14. *Lit.* B. or, if you pleaſe, you may have them fixed, each in a diſtinct Handle, like that at *Fig.* 16 and 17. taken from FAUCHARD's *Chirurgien Dentiſte*. Theſe Inſtruments being applied to the Teeth near the Gums, ſerve to ſcrape off the foul Cruſt from their Out-ſide, while you ſupport them within by the Fingers of your left Hand, taking Care not to wound the Gums, or looſen and diſplace the Teeth. In this Caſe it will be alſo ſerviceable to rub the Teeth and Gums well with the *Tinct. Gummi Laccæ cum Mel. Roſar. & Sp. Salis, aut Vitriol. Gut.* which will not only whiten the Teeth, but alſo render the Gums more firm. I remember to have ſeen an Operator for the Teeth, in *Saxony*, who, though he was furniſhed with various Inſtruments, did not uſe any of them in my Preſence upon ſeveral Patients, but that at *Fig.* 17. Cure.

II. But to prevent the black and morbid Cruſt from ſpreading over the Teeth again, it will be neceſſary to ſupply the Patient with a mild Dentifrice, with which he may frequently rub his Teeth every ſix or ſeven Days, and render them white and ſplendid. But the too frequent rubbing of the Teeth with ſtrong and acrid Dentifrices, does the Teeth as much or more Harm than neglecting them. The common Dentifrices for this Purpoſe are compoſed of Powder *ex pumicibus, lateribus, Coralliis, Tabaccæque cineribus, &c.* But theſe by their Roughneſs wear away the Teeth: and the acrid Spirits, as thoſe of Vitriol, and common Salt, diſſolve and eat them away by Degrees. Therefore it will be ſafeſt to uſe Dentifrices compoſed of ſofter Subſtances, as the *Ocul. Cancror. Mater perlar. Corn. Cervi. Cret. pp. cum Rad. Florent.* or *Myrrh. &c.* When the Gums are looſe and flaccid, you may add a few Drops of *Sp. Salis* or *Vitriol.* or the following Mixture: Prevention.

℞ *Cretæ præparatæ,*
Myrrh. rubr.
Rad. Irid. Flor.
C. C. præparat. ana ʒj *vel* ij.
Sp. Sal. Gt iij *ad* vj. *m. f. Pulv. tenuiſſimus.*

Or thus, ℞ *Conchar. præparatar.*
Matris perlar. præparat. ana ʒij.
Sang. Dracon. ʒj.
Terr. Japon. ℈j. *m. f. Pulv. ſubtiliſſimus.*

Which Powders may be perfumed with a Drop of *Ol. Cinnamon. Caryophil. aut Rhod. Lig.* The Aſhes of Tobacco are very efficacious in cleaning black Teeth, if they are not uſed too often: ſo is alſo the following Mixture:

℞ *Aq. Plantagin.* ℥j.
Mell. Roſar. ℥ij.
Sp. Salis G^t X. *m.*

In theſe may be dipt a Bit of Linen to rub the Teeth with every Day till they are whitened, but ſo as to have ſome other Dentifrice to be uſed every ſixth or ſeventh Day in its ſtead: otherwiſe you will corrode and deſtroy the Teeth by too frequent Uſe of Acids; eſpecially the *Sp. Sal.* and *Vitrioli*, which is the common and pernicious Practice of Quacks. Therefore if you are afraid of injuring the Teeth with theſe, you may frequently waſh them off with cold Water, after the Uſe of them. And, laſtly, one of the beſt Preſervatives for the Teeth is to waſh them with cold Water, and rub them with the Fingers, not only every Morning, but alſo in the Day-time, and in the Evening, adding ſometimes a little common Salt, which will both preſerve them clean and white, and prevent them from aching and decaying.

CHAP. LXIX.

Of Hollow and Decayed Teeth.

THOSE Teeth which are hollow and decayed are uſually carious, and admit ſome Part of the Food into their Cavities, which by Degrees putrify, become acrimonious, and only further deſtroy the Teeth themſelves, but alſo irritate the internal Perioſteum, and ſmall Nerves of this Bone, ſo as to excite intolerable Pain: to prevent which various Methods have been contrived. The firſt is to cleanſe the Cavity of the Tooth with a Needle, Tooth-pick, or ſome other convenient Inſtrument, *Tab.* XX. *Fig.* 19, 20, 21. and then to fill up the Space with white Wax or Maſtich, as often as you ſhall ſee Occaſion: by which Means the Teeth will be preſerved from Foulneſs and farther Decay. When the Caries is but ſuperficial, it may be frequently removed by the Raſp. But when the Diſorder is in the larger grinding Teeth, eſpecially in the Middle, it will be beſt to fill them as exactly as poſſible with a bit of Lead or Gold, by means of the Inſtruments, *Tab.* XX. *Fig.* 20, 21. But when the Caries has reached the Root of the Tooth, ſo as to excite intenſe Pain, the Patient may be relieved by filling the Tooth with *Ol. Caryoph. Cinnam. vel. Lign. Guiac.* &c. and if theſe do not prove ſtrong enough, it may be convenient to cauterize the Tooth with a red-hot Inſtrument for this Purpoſe inſerted into its Cavity, *Tab.* III. *Fig.* 14, 16. or *Tab.* XX. *Fig.* 20, 21. by which Practice you will free the Patient inſtantly of his Pain, without giving him any great additional Torture, provided you do not burn any of the adjacent Parts of the Mouth. That the Teeth which are thus cauterized, may be guarded from a Return of the Pain, they ſhould have their Cavities filled with Lead or Gold as before: and

if

if this laſt Method proves ineffectual, or if the Cavity cannot be filled with Wax, Lead, or Gold, there then remains but one Remedy, which is to extract the Tooth, as we ſhall preſently teach.

CHAP. LXXX.

Of the Chirurgical Methods for eaſing the Tooth-Ach.

SOMETIMES the Tooth-ach is ſo obſtinate and intenſe, as to yield to no Remedy: and therefore the Patient muſt have Recourſe to the Surgeon's Aſſiſtance, who may relieve him ſometimes, 1. By ſcarifying the Gums, as PLINY has long ago obſerved, and which has been confirmed by frequent Experience; or, 2. By inſerting an actual Cautery, or hot Iron into the Cavity of the Tooth, in the Manner directed in the preceding Chapter; or, 3. You muſt ſcarify or cauterize behind the Ear, under that Part which Anatomiſts call *Antitragus*. See Chap. LXVIII. Or, according to SCHELHAMMER, you muſt ſtrongly preſs the Part with the Fingers; or, laſtly, 4. The decayed and aching Tooth is to be drawn.

CHAP. LXXXI.

Of rectifying Irregularities of the Teeth, which lacerate the Tongue and Cheeks.

SOMETIMES the Teeth ſtand more out or in than they ought; and ſometimes the ſharp Points of a broken Tooth ſtand out unequally. Theſe Accidents not only impede the Maſtication of the Food, and Formation of the Voice, but frequently lacerate the Tongue, Lips, or Cheeks, from whence very often proceed Inflammations, Tumours, Ulcers, and ſometimes a Cancer. To remedy which Diſorders it will be neceſſary to file away the Inequality by the Inſtrument repreſented *Tab.* XX. *Fig.* 22. or, when that is impracticable, to draw the Tooth.

CHAP. LXXXII.

Of drawing Teeth.

I. TOOTH-DRAWING, according to CICERO, (*De Natura Deorum, Lib.* iii. *Cap.* 22.) was firſt invented by ESCULAPIUS; in whoſe Temple the Ancients hung up a Pair of leaden Pincers, to ſignify, as I think, that it would be dangerous and improper to extract any Teeth, but ſuch as might be removed with leaden Forceps; that is, ſuch as are looſe, and almoſt ready to fall out: for they do not conſult their own Welfare, who imprudently remove their Teeth without abſolute Neceſſity, whilſt they are ſound and entire. For

Evulſion

Evulſion of the Teeth is not only a dangerous and painful Operation, but has even ſometimes hazarded the Patient's Life: at leaſt they deform the Speech, and impair the Act of Maſtication by this Means, more eſpecially in Adults, in which we can have no Hopes of others growing up in their room: However, it is ſometimes abſolutely neceſſary to draw Teeth.

II. 1. In Infants for removing thoſe deciduous or lacteal Teeth, which, being looſened by the Fingers, may be extracted with a Thread, or a Pair of Crow's Bill Forceps; for when theſe Teeth are left too long in the Sockets, they may diſplace and turn the new ones awry. 2. It will be proper to extract thoſe Teeth in Infants which grow out of the Palate, or ſome other improper Part of the Mouth, which both hinder their Speech and Sucking. 3. Extraction is often the only Method of relieving the Tooth-ach, which is very intenſe, proceeding from a Caries in the Teeth, and incapable of being eaſed by any Medicines. 4. Thoſe Teeth ought to be drawn, which, by their irregular Figure and Poſition, wound and lacerate the Tongue, Lips, and Cheeks. 5. It is often abſolutely neceſſary to draw a Tooth for curing a Fiſtula, or Ulceration of the Gums next the Teeth.

III. The Method of drawing them is as follows. If the Tooth to be drawn is fixed in the lower Jaw, the Patient muſt be ſeated on a low Seat, or on the Floor. But when in the upper Jaw, he muſt be ſeated on a high Stool: after which the Surgeon takes his Inſtrument beſt adapted to the Caſe, and thereby draws out the Tooth, as if extracting a Nail out of a piece of Wood, drawing the upper Teeth downward, and the lower Teeth upward: yet there is a particular Slight to be uſed, to avoid breaking the Teeth, as you may ſee deſcribed more at large in M. FAUCHARD's Book, intituled, *Le Chirurgien Dentiſte.*

IV. The Inſtruments uſed for Tooth-drawing are ſo many and various, that almoſt every Operator is furniſhed with a particular one of his own. But thoſe moſt in Uſe are the *Pelicanus*, *Forfex*, and *Crow's Bill*; and leſs common, but more commodious, are the Inſtruments repreſented in *Tab.* XX. *Fig.* 23, 24, and 25. though the Uſes of them can be much ſooner ſhewed to the Eye, than deſcribed by Words [a]. There are alſo various Inſtruments for drawing Stumps of Teeth, which cannot be extracted with the *Forfex*, particularly the *Goat's Foot*, and that at *Fig.* 26. That End of *Fig.* 23. marked A, alſo ſerves for this Purpoſe.

V. We ſhall conclude this Chapter with obſerving, that though it is often abſolutely neceſſary to remove or extract the Teeth, yet you ought not to perform the Operation while the Patient's Gums, and Parts adjacent, remain inflamed and tumified. For there is great Danger in theſe Caſes of throwing the Patient into violent Tortures, and indeed of worſe Symptoms enſuing, and ſometimes very dangerons Hæmorrhages. But, above all, we ſhould particularly diſſuade Women with Child from this Operation.

[a] More Inſtruments may be ſeen in FAUCHARD's *Chirurgien Dentiſte*, Paris, 8vo 1718. and in M. GARENGEOT's *Traité des Inſtrum. Chirurg.* 8vo Paris 2d Edit. 1727.

CHAP.

Fig. 1.

Fig. 11.

Fig. 12.

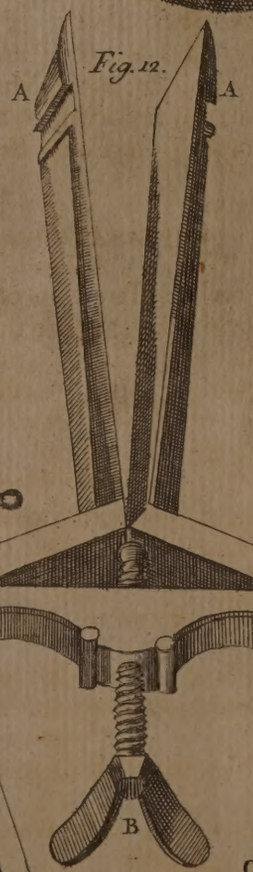


Fig. 13.

Fig. 14.

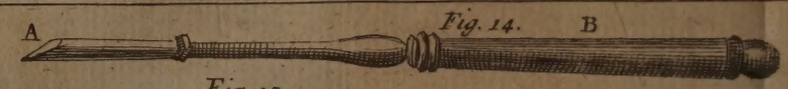


Fig. 15.

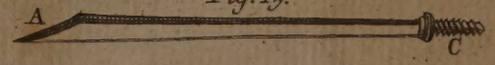


Fig. 16.

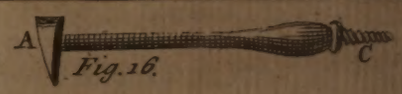


Fig. 17.

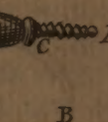


Fig. 18.

Fig. 19.

Fig. 20.

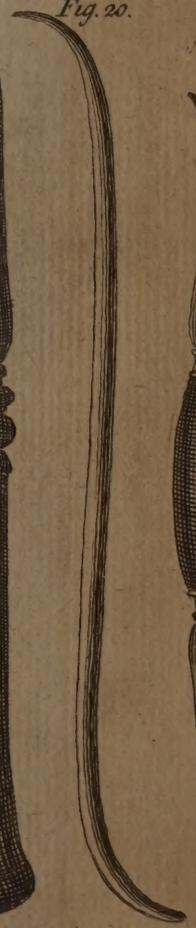


Fig. 21.

Fig. 22.

Fig. 24.

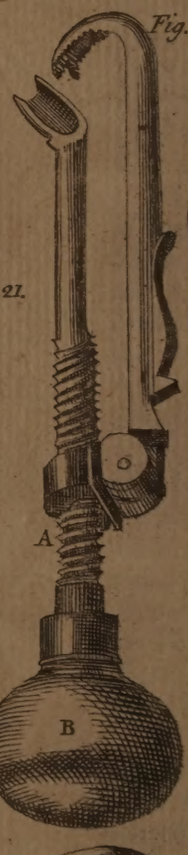


Fig. 25.

Fig. 26.

Fig. 23.

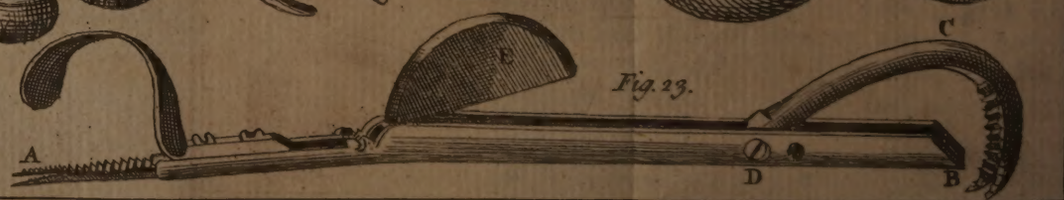


Fig. 2.

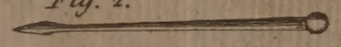


Fig. 3.

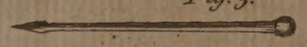


Fig. 4.

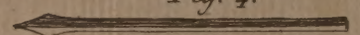
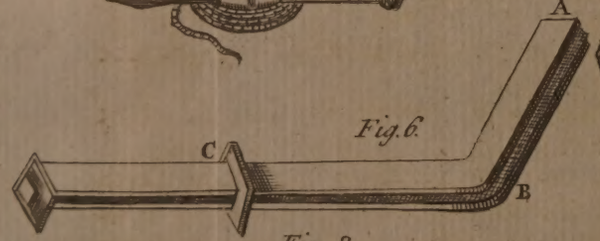


Fig. 5.

Fig. 6.



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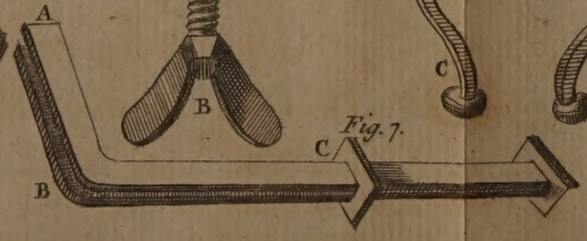


Fig. 8.

Fig. 9.

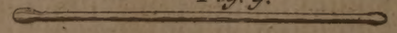
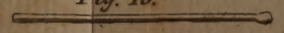


Fig. 10.



J. Myn. de fc.

CHAP. LXXXIII.

Of Artificial Teeth.

THE great Deformity of the Face, and the Impediment of the Speech, occaſioned by the Loſs of one or more of the Teeth in the anterior Part of the Mouth, has occaſioned the Art of framing other Teeth to ſupply their Places, made of Ivory, Bone, or the Tooth of a Sea-horſe. When ſeveral Teeth are out in the ſame Place, it is beſt to make a Sett, or the Number wanted, out of one Piece, all adhering together, which may be faſtened to the two next of the ſound or natural Teeth. But to preſerve theſe artificial Teeth clean and ſound, it is adviſeable to take them out at going to Bed, to wipe them clean, and to inſert them again in the Morning. But if any Stump or Splinter ſhould reſiſt and obſtruct the replacing of the artificial Teeth, it muſt either be extracted, or taken down by the File. See more upon *artificial Teeth* in FAUCHARD.

EXPLANATION *of the* TWENTIETH PLATE.

Fig. 1. Repreſents the Hare-Lip of an Infant two Years old, whoſe Palate was alſo fiſſured, and you may ſee the two *Dentes Inciſores* on the left Side.

Fig. 2. Denotes a triangular pointed Needle for joining the Hare-Lip.

Fig. 3, and 4. Are two other Needles for the ſame Purpoſe, the former with a flat Point, and made of Braſs or Silver, and the latter of the ſame Make and Metal, but without a Head.

Fig. 5. Repreſents two of theſe Needles paſſed through the Hair-Lip, with a Ligature circumvoluted or tied round them orbicularly.

Fig. 6 and 7. Repreſent a Couple of *Tenacula* uſed by ſome in the Hare-Lip, to ſecure and retain the Margins which they ſcarify, and prevent their profuſe Bleeding. The Parts A B are thoſe which hold the Lip faſt, by thruſting up the Rings C C towards B B.

Fig. 8. Is a Needle in Form of a Larding one, contrived by M. PETIT of *Paris*, to perforate the Hair-Lip, and introduce the Pins *Fig.* 9. inſerted in its Fiſſure.

Fig. 10. Is a Needle which I prefer before the former, it having but one Head.

Fig. 11. Is a Face with an ulcerated Cancer in the lower Lip *a a a*; *b b b* Part of the cancerous Tumour extending itſelf to the left Angle of the Lips.

Fig. 12. Repreſents the *Speculum Oris* furniſhed with a Screw to open the Teeth and Jaws when they are clinched faſt together in Convulſions, *&c.* A A the Parts which are interpoſed betwixt the *Dentes inciſores*, and which are divaricated or opened by the Screw B.

Fig. 13. Is another *Speculum Oris* made almoſt like a Pair of Forceps; A the Part which depreſſes the Tongue, while the Parts B B elevate the *Dentes inciſores* of the upper Jaw under which they are placed; C C the Handles.

Fig.

Fig. 14, 15, 16, and 17. Repreſent ſeveral Inſtruments to ſcrape and cleanſe the Teeth from tartarous and diſcoloured Cruſt, each of which are adapted by the Screws C C C to the Handle B at *Fig.* 14.

Fig. 18, and 19. Are two Inſtruments for the ſame Uſes, but larger, and judged to be the moſt commodious by FAUCHARD.

Fig. 20, and 21. Are two Inſtruments for cleanſing and cauteriſing hollow Teeth, and for filling their Cavities with Lead or Gold.

Fig. 22. Is a Raſp or File to take down rough or angular Parts of the Teeth: A the File, B the Handle.

Fig. 23. Is an *Odontagra*, or Inſtrument to draw Teeth. The Part A ſerves to extract Stumps inſtead of the *Goats-foot*; and the Part B with the Hook C ſerves to extract whole Teeth. For the Hook C may be not only elongated to the Size of the Tooth by the Screw D: but it may be alſo turned back, and repoſited in the Caſe E, ſo as to be conveniently carried in the Pocket.

Fig. 24. Is another convenient *Odontagra*, which may be eaſily adapted either to large or ſmall Teeth, by ſcrewing round the Nut B.

Fig. 25. Is another for drawing the Teeth, furniſhed with three Hooks, one ſtraight A, and two crooked B C; the ſtraight ſerving to draw out the anterior, and the crooked the poſterior Grinders on each Side the Jaw, faſtened to the Inſtrument by the Screw D: alſo the *Fulcrum* of the Inſtrument F may be ſet longer or ſhorter from the Handle by the Screw G.

Fig. 26. Is an Inſtrument for exrracting ſome Teeth, and particularly Stumps.

Of Chirurgical Operations in the Gums.

CHAP. LXXXIV.

Of Lancing the Gums in Dentition.

THE Difficulty which ſome Infants meet with in cutting their Teeth, very often excites not only intenſe Pain and Inflammation in the Gums, but alſo Convulſions and epileptic Fits, which frequently kill the Infant. The Gums in theſe Caſes are uſually too thick and tough to be pervaded without great Difficulty by the young Teeth ſhooting up: which as they gradually advance, violently diſtend the Gums, and excite the forementioned Symptoms. Upon the Appearance of theſe, when you are called to an Infant, you ſhould inſpect the Gums, and make a tranſverſe Inciſion upon the Tooth, where it ſhews itſelf to be riſing by a Redneſs and Tumour of the Gums; after which thoſe malignant Symptons will generally diſappear [a], and the Wound may be treated with *Syrup Viol.* or *Mel. Roſar.* Dr. SYDENHAM aſſerts, that the difficult Dentition of Infants, though unattended with any Inflammatory Diſorder, can by no Means

[a] As hath been obſerved by PAREY *Lil.* XXIII. Chap. 67. SYDENHAM *in Opuſc.* and DRAKE *Anat.* Book IV. Chap. III.

be better relieved than by Phlebotomy. And, in Adults, VESALIUS[a] obſerves, that the Pain and Inflammation which often ariſes at cutting the *Dentes ſapientiæ*, at near twenty Years of Age, is preſently relieved by inciſing or ſcarifying the Gums affected, as I was obliged to do for myſelf when about twenty-ſix Years old. We have alſo an Obſervation in AMB. PAREY's Surgery (*Book* 24. *Chap. ult.*) of a Son eight Months old of the Duke of *Navarre*, who was loſt for want of having his Gums lanced in difficult Dentition.

CHAP. LXXXV.

Of Epulides *or Excreſcences of the Gums.*

THE fleſhy Tubercles or Excreſcences of the Gums termed *Epulides*, are of two Kinds; ſome being of a mild Nature, and without Pain, others malignant and inclining to be cancerous. They are again diſtinguiſhable from their Size and Appearance, into large and ſmall, hard and ſoft, and ſupported either by a broad or ſlender Root. Theſe Excreſcences not only deform the Mouth, but are alſo an Impediment to the Speech, and to Maſtication, and do therefore require a ſpeedy Extirpation, which is the beſt Method of relieving the Patient. When this Kind of Excreſcence in the Gums is ſuſtained by a ſmall Root, the beſt Method of Extirpation, is by a Ligature, about the Root, with a Thread[b]. But when the Root is broad, it will be more convenient to extirpate the Excreſcence by mild Eſcharotics or Cauſtics, particularly *Ol. Tartar. p. d. vel. Sp. Salis Ammoniaci.* And when the milder Sort of this Tribe prove ineffectual, it will be ſafeſt to extend them with a Hook, or the Pliers, while you extirpate them with the Scalpel, yet ſo as to avoid ſeparating the Gum itſelf from the maxillary Bone, which might produce a *Caries*. The Blood may be permitted to flow for ſome Time: but if it proves too profuſe and laſting, an aſtringent Gargariſm muſt be uſed, of red Wine or Oxycrate, with Alum, with which the Patient muſt frequently waſh his Mouth, till the Hæmorrhage ceaſes. When the Blood is ſtopped, the Parts affected may be treated every Day with *Tinctura Myrrhæ cum Melle Roſarum*, the Uſe of which ſhould be continued till they are healed. If any Part of the Tubercle ſhould remain behind, or ſprout up again, it ſhould be taken down in Time by the before-mentioned mild Eſcharotics, or with a bit of *Vitriolum Cæruleum*, or elſe removed with the Sciſſars or Scalpel. The actual Cautery is here recommended by ſome, who give us Inſtances of Cures this Way performed; but the Application of them is not only very inconvenient in the Mouth, but alſo extremely painful. A remarkable Inſtance of this Diſorder removed by the Scalpel is given by MEEKREN, in *Obſ.* XXVIII. And SCULTETUS, in *Obſ.* XXXV. ſays, he happily extirpated an Excreſcence of this Kind, which adhered to the Gums cloſe to the Palate behind the anterior Teeth, by applying the Pair of

[a] *De Humani Corporis Fabrica*, Lib. I. Cap. XI.
[b] An Inſtance of this Method of Cure you have in SCULTETUS.

Plyers made for removing *Polypuſes.* And a few Years ago I obſerved one in the Palate behind the *Dentes inciſores*, of a certain Monk, which being accompanied with a *Spina ventoſa* in the Bones of the Palate, and the Patient not willing to admit the Uſe of the Cautery, it at laſt killed him.

CHAP. LXXXVI.

Of Parulides, *or Boils and Abſceſſes of the Gums.*

SOMETIMES a Tumour and Inflammation of the Gums, in various Degrees, ariſes from intenſe Pains of the Teeth and Jaws: which inflammatory and painful Tumours are by the *Greeks* termed *Parulides*, and popularly they are denominated Gum-boils. The Treatment of them muſt be conducted like that of other inflammatory Tumours, *viz.* by Diſcutients. But if they fail, or if the Diſorder be neglected, it uſually terminates in an Abſceſs or *Fiſtula.* Therefore if the Tumour be recent, you had beſt abate the Pain, which hinders the Patients from Sleep, by bleeding firſt, and then by the Application of the following Diſcutients, *viz. Chamœmeli Salvia, Flores Sambuci*, &c. boiled in Water or Milk, which ſhould be often taken warm into the Mouth by the Patient, and held therein for ſome Time. Externally may be applied Bags filled with the ſame Herbs, or elſe a Plaſter of Melilot or Diachylon with Camphire, ſecured with a warm Handkerchief to keep out the Cold, not neglecting diſcutient and diaphoretic Medicines internally. If the Diſorder canot be thus diſperſed, you will have Occaſion for the Uſe of emollient Applications, ſuch as Mallows, Marſh-Mallows, Mullen, Figs, &c. boiled in Milk, and frequently retained in the Mouth. To forward the Maturation externally, you may apply half a roaſted Fig to the Tumour with an emollient Cataplaſm ſecured upon the Outſide of the Cheek. When the Softneſs of the Tumour denotes its having come to Suppuration, you ought immediately to open it by Inciſion, to diſcharge the Matter, leſt it ſhould erode the adjacent Bone, or produce a ſtubborn *Fiſtula.* The contained Matter may be diſcharged after your Inciſion, partly by preſſing with the Fingers, and then with warm Wine, or a Decoction of vulnerary Herbs mixt with *Mel. Roſar.* which ſhould be alſo uſed as a Gargle, till the Parts are well cleanſed and healed. When the Ulcer penetrates deep, it will be neceſſary to inject this Decoction by a Syringe; and after diſcharging the Liquor again, a Compreſs is to be ſecured upon the Bottom of the Ulcer with a Bandage, to make that Part unite firſt. But when the Ulcer degenerates into a *Fiſtula*, accompanied with a *Caries* in the Bone, you ought then, after each Injection, to apply a little *Tinct. Myrr. vel Elix. Proprietat.* to deterge the Parts, and diſpoſe them for healing. By which Method I have frequently cured not only ſimple Ulcers of the Gums, but alſo thoſe which have been accompanied with a *Callus* or *Caries*, and of above a Year's ſtanding. But if all theſe Medicines prove ineffectual, the *Fiſtula* muſt be laid open by Inciſion, and the *Caries* removed either by Medicines, the Raſp, or the actual Cautery, as we have directed before in Part I. Book V. Chap. VIII. Sometimes a carious Tooth occaſions the *Fiſtula* of the Gums, which therefore ought to be firſt extracted, before the Application

Application of the proper Medicines. There are ſeveral Obſervations upon theſe Diſorders in the *Miſcellanea Berolinenſia:* from whence it appears, that ſuppurating Medicines are of little or no Service; and that if theſe Tumours are not quickly laid open by Inciſion, and the Tooth extracted, they degenerate into obſtinate *Fiſtulæ*. It is therefore much the beſt to be rather too early than late with your Inciſion, in order to diſcharge the Matter, though crude, rather than let it ſpread the Diſorder, ſo as to affect the Bone, under a Notion of bringing it to Suppuration. For more on this Subject, the Reader may conſult an accurate Diſſertation *De Epulide & Parulide*, publiſhed by SCHELHAMMER, *An.* 1692.

Of Chirurgical Operations in the Tongue.

CHAP. LXXXVII.

Of depreſſing the Tongue.

THERE are many inflammatory Diſorders of the Mouth, Palate, Tonſils, *Uvula*, and *Fauces*; alſo Tumours, Abſceſſes, *&c.* in thoſe Parts; which require a Depreſſion of the Tongue to inſpect and treat with proper Remedies. To perform this, the Inſtrument termed *Gloſſoſpatha*, or *Speculum Linguæ*, *Tab.* I. *Lit.* P, has been generally uſed. But the nicer Patients, who are averſe to an Inſtrument of this Kind that has been applied to others, make Uſe of the flat Handle of a Silver Spoon, with more Neatneſs and Convenience: but the Application of either of theſe Inſtruments ſhould be made very gently, to avoid giving the Patient Pain, and that you may not irritate the inflamed Parts. So when there is Occaſion for any Injections, the Syringe is to be conveyed into the Mouth, over the Handle of the *Spatha* or Spoon: or if there be any Ulcer of the Mouth, a *Polypus* in the Noſe, or any Diſorder in the Tonſils, in which the Mouth cannot be ſufficiently opened, you may then make uſe of the *Speculum Oris*, *Tab.* XX. *Fig.* 12 or 13.

CHAP. LXXXVIII.

Of dividing the Frænulum *of the Tongue.*

I. THE Tongue is ſometimes tied down too cloſe to the Bottom of the Mouth by a Ligament connected all along to its Middle, uſually termed its *Frænulum*, which requires to be inciſed or divided, to give this Organ its proper and free Motion. This Diſorder generally ariſes in Infants ſoon after their Birth; ſo that they cannot move and properly exert their Tongues in the Action When the Operation is neceſſary.

of Sucking; though it is ſometimes alſo obſerved in Adults; and in both requires the Care of the Surgeon. However, it may be obſerved, that this Operation is not neceſſary in all new-born Infants promiſcuouſly, as many Nurſes and Midwives imagine; for it is hardly neceſſary in one among a Thouſand of them, and is a Diſorder not ſo often met with as the Hare-Lip, as hath been frequently obſerved by myſelf and many other prudent Phyſicians. When the Infant can put the Tongue out of his Mouth, the *Frænulum* does not require any Inciſion; for that Organ may be then capable both of ſucking and ſpeaking, when there is no other Impediment. But when the Tongue cannot be extended out of the Mouth beyond the Teeth, it may be then indeed neceſſary to divide the *Frænulum*, or other Membrane, by which it is too cloſely connected. But as this Operation is ſometimes attended with bad Accidents, and even the Death of the Infant, when raſhly performed, we ſhall make it our Buſineſs, in this Place, to deſcribe the proper Method in which the ſame ought to be executed.

Method of Inciſing. II. Firſt, the Infant is to be laid in the Lap of a ſtrong Perſon, and his Head held faſt by another Aſſiſtant: then the End of the Tongue is to be covered with a Linen Cloth, and held betwixt the Fingers to prevent it from ſlipping, as in *Tab.* XXI. *Fig.* 1. or elſe the Tongue may be elevated by a Kind of Fork for the Purpoſe, *Tab.* XXI. *Fig.* 2 and 3. or *Tab.* I. *Lit.* O or P: after which the Ligament of the Tongue running betwixt the ranular Veins and inferior ſalival Ducts, it is to be divided with a Pair of obtuſe pointed Sciſſars, *Tab.* I. *Lit.* C, or with a Scalpel, till you think it free enough for ſucking and ſpeaking. But, in dividing the Ligament, you muſt be careful to avoid wounding any of the ſalival Ducts, or the proper Veins and Nerves of the Tongue. For Dionis, in his Surgery, mentions an Infant who expired, ſoon after the Operation, by a profuſe Hæmorrhage from the ranular Veins: and therefore, if you ſhould wound one of theſe, a Compreſs muſt be applied under the Tongue, which has been firſt dipt in Vinegar. If the Tongue is not ſufficiently freed by this Operation at the firſt Time, you may make a farther Diviſion of the Ligament a few Days after, treating the Wound afterwards with *Mel. Roſar.* or *Syrup. Viol.* frequently applied by a Feather, to prevent the lately inciſed Parts from adhering again to each other.

Scholium. III. From what has been ſaid, it appears that this Operation is ſeldom neceſſary, and ſometimes of dangerous Conſequence. Hence thoſe Midwives juſtly deſerve to be cenſured, who always thruſt their Fingers into the Infants Mouth, in order to lacerate this Ligament ſoon after the Birth: for the Inflammation, and other bad Conſequences induced by this raſh Practice, may not only throw the Child into Convulſions, but may even prove the Cauſe of its Death. When therefore ſuch a Diviſion of the *Frænulum* is neceſſary, as it is not very often, it ought to be cautiouſly inciſed with a Scalpel or Pair of Sciſſars, and not roughly lacerated with the Finger-Nails; the bad Conſequences of which may be ſeen related more at large in Hildanus, *Cent.* 3. *Obſ.* 28.

CHAP.

CHAP. LXXXIX.

Of a Ranula *or Tumour, and* Calculi *under the Tongue.*

I. THE Term *Ranula* is generally uſed to ſignify a Tumour or Abſceſs under the Fore-part of the Tongue on either Side, near the Veins of that Name. The Matter contained in theſe Tumours is various, being ſometimes a tenacious and mucous Lymph, ſometimes a thicker and purulent Matter, and ſometimes of a hard and ſtony Conſiſtence. The Tumour itſelf often grows very faſt, and not only impedes the Speech and Deglutition of the Patient, but alſo frequently excites moſt acute Pains. Sometimes indeed we meet with a Sort of fleſhy Tubercles in this Part, which are more dangerous as they are painful, becauſe they ſometimes degenerate into a Cancer, as I have more than once obſerved. Infants are generally more infeſted with Tumours in this Part than Adults: nor can they be eaſily removed, through the Difficulty of applying and retaining Medicines to them. It is alſo ſtill more difficult to bring a *Ranula* to Suppuration for the ſame Reaſons; ſo that the only Relief to be had, muſt be expected from the Hand of the Surgeon. Deſcription.

II. As theſe Tumours are much of the ſame Nature with thoſe of the encyſted Kind, it will be beſt to extirpate them in the ſame Manner, as we have before directed in Chap. XXVIII. but then you will not find it ſo eaſy to remove theſe; partly from the Difficulty of retaining Medicines, and partly from the frequent Cryings of the Infant; which laſt may render the Operator very liable to wound the Nerves, Blood-Veſſels, and ſalival Ducts of the Tongue, whence generally ariſe intenſe Pains, Inflammation, profuſe Hæmorrhage, and perhaps Convulſions, or the Death of the Infant. It will therefore be much ſafer to turn the Tongue upwards, and make a tranſverſe Inciſion upon the Tumour, ſo as to diſcharge its included Matter; after which you may deterge or deſtroy the remaining Tunic with *Mel. Roſar.* ſharpened with *Sp. Vitriol.* and then the Cure may be eaſily completed with *Tinct. Myrr.* and ſimple *Mel. Roſar.* or a Mixture of Oil and Sugar. Sometimes the Tubercle breaks of itſelf, without the Uſe of any Inſtrument or Medicine: and then you muſt deterge and heal the Ulcer as before. Sometimes the ſmall Glands under the Tongue appear much enlarged with Pain and Inflammation: in this Caſe the Patient ought frequently to retain warm Milk, or half a roaſted Fig in his Mouth upon the Parts affected, with an emollient Cataplaſm and Plaſter applied under his Chin, that the Tumour may be either diſperſed or ſuppurated: when it is ripened by this Method, it muſt be inciſed, deterged, and healed, as we before directed for Abſceſſes in the Gums, Chap. LXXXV. I have ſometimes obſerved a Tumour of this Kind under the middle of the Tongue, where the ſalival Ducts open into the Mouth; and in this you ought not to make any Inciſion, to avoid injuring thoſe Ducts, or the adjacent Nerves or Blood-Veſſels: but you ought rather patiently to wait till the Tumour breaks of itſelf, and then you may deterge and heal as before. In cancerous Tumours of this Kind, the Patient will hardly receive any Benefit from any Operation or topical Remedies whatever. If Cauſes.

a ſmall

a ſmall Stone is found in this Part of the Tongue, after making an Inciſion, if it does not fall out of itſelf, you muſt extract it with a Probe or Pair of Pliers, deterging and healing the Wound as before. See ROONHUYS *Obſ. Chirurg.* 29.

CHAP. XC.

Of a Scirrhus *and Cancer in the Tongue.*

Diagnoſis. I. WHEN Part of the Tongue appears tumified and hardened, without Pain, the Diſorder is ſaid to be a *Scirrhus*; which, by becoming painful, and diſcharging a purulent fetid Matter, gradually degenerates into a Cancer, as we before obſerved in treating of a *Scirrhus*. The Tumour, in itſelf, often appears at firſt no larger than a Pea, or ſmall Hazel-Nut; but ſometimes it grows much larger, and occupies the greateſt Part of the Tongue, being either moveable or immoveable. The Cancer of the Tongue is ſometimes latent and entire, and ſomtimes open or ulcerated, diſcharging a putrid and fetid Matter, which gradually deſtroys the Tongue. Sometimes this dangerous Diſorder ariſes without any manifeſt Cauſe; but more frequently it proceeds from ſome ſharp or rough Parts of a Tooth, which prick and wound the Tongue: from which Cauſe I have ſometimes ſeen it eroded laterally, and ſometimes from its Tip backwards.

Cure. II. In the Treatment of this Diſorder, you therefore ought firſt to remove the Roughneſs or Inequality of the Teeth, which injured the Tongue, by the Raſp, *Tab.* XX. *Fig.* 22. or ſome other proper Inſtrument, without which the Diſorder will be continually irritated, inſtead of yielding to the Action of Medicines. After having raſped or extracted the Tooth, the Tongue muſt next be treated with *Tinct. Myrrh.* or *Mell. Roſar.* with *Balſam. Peruvian. vel de Meccha.* When the Diſorder ariſes from internal Cauſes, you muſt treat the Patient with the proper internal Medicines uſual for a *Scirrhus* or Cancer; though generally they take little or no Effect. Where they take no Effect, after applying them for ſome Time, the Aſſiſtance of the Steel muſt be immediately called in; for Delays are of very bad Conſequence, enhance the Complaint, and render the Operation extremely dangerous. There are indeed ſome Tubercles of the Tongue about the Size of a Pea, or a little larger, as I have ſometimes obſerved, which do not always keep of the ſame Size: but being without Pain, they are tolerable for many Years, or even till the Patitent dies, without giving any great Uneaſineſs[a]. Theſe are beſt left to themſelves, like many mild *Scirrhi* and Cancers; for the more you irritate them with Medicines, the worſe they generally grow, ſo as frequently to degenerate into an ulcerated Cancer, and deſtroy the Patient. But when a *Scirrhus* of the Tongue grows very large, and very painful, it ought to be extirpated as ſoon as poſſible. If the Tumor is moveable, an Inciſion muſt be made in the Tongue

[a] I knew an Inſtance of ſuch a Tubercle in the Tongue of a learned Man, which has continued in the ſame State for near theſe thirty Yeats: I perſuaded him not to irritate it with Medicines, but to leave it to Nature.

with

with the Scalpel, till you can readily ſeparate the morbid from the ſound Parts; but when immoveable, and not very large, Part of the Tongue ought to be taken off with it. Yet when it is very large, or ſpreads through the whole Root of the Tongue, it is better to relinquiſh the Operation, by which the Cancer cannot be totally extirpated, rather than torment the Patient to no Purpoſe, or haſten his Death: for if a Cancer be not cleanly extirpated, it uſually rages worſe than before. To perform the Operation, an Aſſiſtant muſt be firſt placed behind the Patient, to hold his Head, with two other Aſſiſtants on each Side, to extend and hold faſt the Tongue, either with their Finger and a Cloth, or Pliers like thoſe in *Tab.* XIX. *Fig.* 9 or 10. After you have extirpated the *Scirrhus*, or Cancer, the Wound may be healed with *Mel. Roſar. &. Balſ. Peruv. vel de Meccha*, deterging with *Tinct. Myrrhæ*, and healing with *Ol. Amygd. dulc. rec. cum Saccharo*, in the Form of a *Linctus*. When the Cure is completed, the Patient muſt be confined to a proper Regimen and Diet all his Life, with the Uſe of proper Remedies at ſtated Seaſons, to prevent a Relapſe, as we before directed for Cancers. We have a remarkable Inſtance of this Diſorder cured by the expert Anatomiſt RUYSCH, in *Obſ.* 76. in which, having extirpated the ulcerated Cancer in the Tongue by the Scalpel, he applied the actual Cautery, and afterwards completed the Cure, which could not be effected without Cauterization, though it had been ſeveral Times extirpated before. On the other Hand MARESCHOTT, a Phyſician of *Modena*, gives you as remarkable an Inſtance, where a large cancerous Tumour was effectually cut off from the left Side of the Tongue. See his Treatiſe on this Operation, publiſhed at *Modena*, 1730.

CHAP. XCI.

Of Ulcers in the Palate.

I. WE ſometimes meet with Ulcers in the Palate, which not only deſtroy the adjacent fleſhy Parts, but alſo erode and extend themſelves into the Bones of the Noſe. The Patient afflicted with theſe has not only his Speech vitiated by them, but alſo any Liquor, upon drinking, regurgitates into the Noſe with great Uneaſineſs. Such Ulcers proceed moſtly from a ſcorbutic Acrimony, or a venereal Infection in the Blood: and if thoſe Diſorders are not ſpeedily removed, as their immediate Cauſe, the Ulcers will frequently deſtroy not only the whole Palate, but alſo the ſeveral Parts of the Noſe itſelf, to the great Miſery and Deformity of the Patient. Their Symptoms and Cauſes.

II. In the Cure of theſe Ulcers you muſt have a principal Regard to the morbid State of the Blood, and firſt correct its venereal or ſcorbutic Acrimony, with proper internal Medicines. If the Palate is not yet perforated by the Ulcer, it will be proper, firſt, to cleanſe the Parts by frequently injecting a detergeing Gargle made of vulnerary Herbs, and mixed either with *Mel. Roſar. Ung. Ægypt. vel. Fuſc. Wurtzii*, as you would have it more or leſs deterging. The Honey that ſwims on the Top of *Ægyptiacum* and the *Aqua aluminoſa Fallopii*, are good Detergents in theſe Ulcers, which are accompanied with *Caries*. After Cure.

theſe

theſe Detergents have been uſed ſome Time, ſo that the Ulcer appears clean, you may then dreſs with *Mel. Roſar. Tinct. Myrrhæ, Elix. Propriet. vel. Balſ. Peruv.* applied with Lint.

When with Caries. III. When the Bones of the Palate are alſo carious, the foul Parts will very often ſeparate from the ſound by the Uſe of the aforeſaid Medicines; eſpecially if you ſometimes dreſs with *Mel. Roſar.* acidulated with *Sp. Vitrioli.* But when theſe prove inſufficient, you muſt gently apply an actual Cautery to the foul Bone, after you have firſt cleanſed and dried it with Lint, and ſecured the Tongue, by depreſſing it with the *Specillum Oris* or a *Spatula.* After your Cauterization, the Parts muſt be dreſſed with Balſams, till the naked Bone is again covered with Fleſh. But ſometimes theſe Perforations of the Palate into the Noſe are never cloſed up again, but remain open.

CHAP. XCII.

Of ſtopping Perforations of the Palate into the Noſe.

WHEN the Palate is perforated into the Noſe, ſo as to vitiate the Speech, and occaſion Liquors to regurgitate in this Organ upon drinking, your Remedy in this Caſe is to cloſe or ſtop the Perforation as exactly as poſſible by Art, with a proper Inſtrument; ſince you cannot procure the Bone and Fleſh to grow ſo as to fill up the Space. The Patient muſt therefore have a Plate of Silver or Gold adapted to the Perforation, and furniſhed with a Handle or ſmall Tube, which being armed at the Top with a Sponge, as in *Tab.* XXI. *Fig.* 4, 5. he may thereby exactly cloſe the Perforation. The Sponge being inſerted into the Perforation, prevents the Plate from falling down from the Palate, and by that Means renders the Patient able to ſpeak and ſwallow, as if his Palate was entire. But he ſhould be provided with two of theſe Inſtruments, that after one has been wore a Day, it may be extracted, waſhed, and dried againſt the next Day, to prevent the imbibed Humour from putrifying and ſmelling. I once ſaw ſuch a Perforation of the Palate, occaſioned by a Bullet, in an Officer, which was remedied in this Method. PARÆUS deſcribes another Kind of Plate, which he uſes without the Aſſiſtance of the Sponge. See B. XXII. Chap. 4.

Of Chirurgical Operations on the *Uvula* and Tonſils.

CHAP. XCIII.

Of a Tumour and Prolapſus *of the* Uvula.

Cure by Medicines. I. THE *Uvula* is ſometimes ſo much enlarged and elongated, as even to reach the *Larynx* and *Pharynx*, and obſtruct the Actions both of Reſpiration and Deglutition, as well as Speech. If it proceeds from a recent

Inflammation, as you may judge from the Pain, Heat, and Redneſs of the circumjacent Parts, the Patient may be relieved with cooling Gargles and Injections of Wine and Water, or a Decoction of proper Herbs with a little Alum, or *Sal Ammoniacum:* but at the ſame Time proper Coolers muſt be uſed internally, with Bleeding, Purges, and Clyſters, to prevent the Inflammation from ſpreading through the *Fauces*, and exciting a Quinſy. Scarifications are very uſeful here, both to remove the Inflammation and prevent its ſpreading, as I have long ago experienced both upon myſelf and others. When this Part is too much relaxed and elongated by phlegmatic Humours, it uſually appears white, and free from Pain or Inflammation: and therefore in this Caſe you will find moſt Benefit from a Gargle of warm *Sp. Vini* and Water, or an aſtringent Decoction *ex Flor. Roſar. rub. & Liguſtri, Cort. Granator. &c.* mixed with *Sp. Vini vel Sp. Salis Ammoniaci.* If the Diſorder ſtill continues, another Method muſt be taken to remove the phlegmatic Humours by an Aſperſion or Powder *ex. Zinzib. vel Piper. cum Cort. Granator.* which may be alſo mixed with Honey, and applied with a Tea-ſpoon, or the Inſtrument in *Tab.* I. *Fig.* 4. not neglecting proper diaphoretic and cathartic Medicines internally at the ſame Time.

II. When the Diſorder ſtill continues, notwithſtanding the Uſe of theſe Remedies, ſo as to obſtruct the Patient's Reſpiration, Deglutition, and Speech, it will then be neceſſary to remove ſo much of the *Uvula* as ſhall appear to be ſuperfluous, which may be taken off ſeveral Ways. The firſt is by Ligature, made upon the *Uvula* with an Inſtrument for the Purpoſe, as we have repreſented in *Tab.* XXI. *Fig.* 6. from Hildanus and Scultetus. Firſt, a ſtrong Thread A is conveyed through the Hollow of the Inſtrument by the long Needle, *Fig.* 7. ſo as to make a Nooſe with it in the Ring B, through which Nooſe is tranſmitted ſo much of the *Uvula*, as ſhall be thought ſuperfluous, and by drawing the Thread C, the Nooſe is firmly contracted; then removing the Inſtrument, the Ligature is left upon the *Uvula*, and by Degrees tightened on the following Days, till the inferior and redundant Part of the *Uvula* drops off. But it muſt be confeſſed, that this ingenious Method is very tedious and troubleſome both to the Patient and Surgeon. There is a much more ready Method than this, by depreſſing the Tongue with the *Spathula*, *Tab.* 1. *P* or R, and then clipping off the redundant Part of the *Uvula* with a Pair of Sciſſars; in performing which the main Point is to extirpate neither more nor leſs than neceſſary. For if you remove too little, the Patient's Reſpiration will be ſtill impeded, and he will be little the better for the Operation: and if you remove too much of the *Uvula*, the Patient's Voice will be vitiated afterwards. But if the Surgeon's Hand is not ſtrong enough to depreſs the Tongue with the *Spathula*, and extirpate Part of the *Uvula* at the ſame Time, it will be moſt convenient for him to operate with the Inſtrument contrived by a Countryman of *Norway*, where this Diſorder is very frequent: which Inſtrument is alſo very well deſcribed by Bartholin and Scultetus. It conſiſts of a little Knife faſtened to a broad Plate of Steel, which is perforated in the fore-part, and by letting looſe a Spring on the Side of the Plate, the Knife flies out with great Celerity, and cuts off the redundant Part of the *Uvula*. This Inſtrument has, I think, been reformed by Raw as in *Tab.* XXI. *Fig.* 8. ſo as to be without any Spring. The Knife C being ſtrongly thruſt forwards through

Cure by Abſciſion.

the Stick B B, at once cuts off ſo much of the *Uvula* as you let through the *Foramen* A, the Inſtrument itſelf being held in the Mouth with the left Hand by the Handles D D D, ſo as to depreſs the Tongue ſufficiently at the ſame Time, without the Uſe of a *Speculum Oris*.

How to reſtrain the Hæmorrhage.

III. Having thus extirpated the redundant Part of the *Uvula*, the Blood may be permitted to flow a while, and then you may reſtrain it by a Gargle of warm Wine, Vinegar, or *Oxycrate:* and, if it ſtill continues, you may apply a little Alum by the Spoon, *Tab.* I. *lit.* N. or you may, after the Manner of the Ancients, touch it with a hot Iron, but not red till the Hæmorrhage ceaſes. But when the *Uvula* is alſo infeſted from ſome venereal Cauſe at the ſame Time, the Surgeon muſt in the Interim treat the Patient with proper internal Medicines before he can expect or obtain a Cure.

CHAP. XCIV.

Of Scarifying the Tonſils when inflamed in a Quinſy.

A Violent Inflammation of the Tonſils, eſpecially in a Quinſy, may be juſtly ranked among the moſt dangerous Diſorders: becauſe we are aſſured from Experience, that it may be followed with a Gangrene and fatal Conſequence. To prevent which, we muſt call in the Aſſiſtance of the moſt potent antiphlogiſtic Remedies, ſuch as bleeding in the Arm, Foot, Neck, and under the Tongue, with Scarification of the Tonſils themſelves, beſides the Remedies before propoſed for an Inflammation of the *Uvula*. It was a Practice with the ancient Surgeons to ſcarify, and cup upon the external Parts of the Neck neareſt to the Tonſils; the Uſefulneſs of which I have often experienced. And I am alſo informed, by an expert Phyſician, that in *England* they often, after Celsus's Example, ſcarify the Tonſils internally: by which Means, with the Uſe of proper internal Medicines, drinking Plenty of thin Liquors, and with cooling Clyſters often repeated, the Patient uſually recovers. Therefore it is nothing extraordinary to meet with the ſame Practice among the *French* Phyſicians, as we are told by Garengeot in the firſt Edition of his *Surgery*, Tom. II. Pag. 456. For the more commodious Scarification of theſe Parts, the Operation is uſually performed with the Inſtrument, *Tab.* XXI. *Fig.* 9, with which the Tongue may be alſo depreſſed at the ſame Time, the Lancet or *Pariſthmiotomus* lying concealed. Inſtead of this Inſtrument (which I long ago deſcribed and figured with the Form and Poſition of the *Uvula*, and Tonſils in *Ephem. Nat. Curioſor.* Cent. IV. Obſ. 191.) M. Petit has contrived one which M. Garengeot delineates, almoſt like mine, and ſays it was firſt deſcribed by Valentinus in his *Surgery:* when Valentinus in pag. 102. of his ſaid Book, openly declares me to have been the firſt that deſcribed and figured the Inſtrument.

CHAP. XCV.

Of opening Abſceſſes in the Tonſils.

I. BY the Neglect or Miſmanagement of an Inflammation in the Tonſils, the obſtructing Matter, which ought to have been diſperſed, becomes either concreted or ſuppurated ſo as to form an Abſceſs or *Scirrhus*. You ought in this caſe to forward Suppuration as faſt as poſſible by the Uſe of Gargles internally, and emollient Cataplaſms externally; that the Patient may by this Means not be in Danger of Suffocation, or loſing his Speech and Deglutition, by the too great Progreſs and Continuance of the Diſorder. For which Reaſons it is alſo generally unſafe to wait till the Matter makes its own Way through the Tumour; but it ought to be diſcharged by Inciſion as ſoon as you can perceive its Point, or are ſatisfied there is Matter included: to determine which, requires a ſtrict Examination both by the Eye and Touch. Cauſes.

II. When the Surgeon is aſſured of an Abſceſs in the Tonſils, he muſt inveſt one of the longeſt Lancets he can procure, almoſt up to its Point with a ſlip of Plaſter, ſo that not above half a Finger's-Breadth of its Point may remain uncovered: then depreſſing the Tongue by the *Spathula*, *Tab.* I. *lit.* P. or by the broad Handle of a Spoon, he next intrudes the End of his Lancet in the moſt promiſing Part of the diſeaſed Tonſil; whereupon the confined Matter will break forth, and much relieve the Patient from his intenſe Pains. The Operation may be performed ſtill more commodiouſly by the *Pariſthmiotomus*, or Inſtrument for ſcarifying the Tonſils, repreſented in *Tab.* XXI. *Fig.* 9. becauſe this will both perform the Office of depreſſing the Tongue inſtead of a *Spathula*, and at the ſame Time ſcarify or inciſe with its Lancet which is here concealed, and may therefore be much better uſed for Infants and timorous Patients, who will hardly or not at all admit of the Knife. Method of Apertion.

III. After having opened the ulcerated Tonſils by Inciſion, the Patient muſt gargle ſeveral Times in a Day with a Decoction of vulnerary Herbs mixed with Wine or *Mel. Roſar.* after it has been firſt made warm; in the Uſe of which he muſt continue till the Parts are healed. In the mean Time the Patient muſt ſtrickly abſtain from all ſtrong, ſalt, and ſpicy Aliments, and from all acrid Medicines; leſt any of them, adhering in the Wound, ſhould irritate and excite a new Inflammation, to the Hazard of his Life. Treatment after Inciſion.

CHAP. XCVI.

Of extirpating ſcirrhous Tonſils.

I. THE Tonſils are ſometimes ſo much enlarged and indurated after an Inflammation, as almoſt to ſhut up the *Fauces*, and prevent the Patient from either breathing or ſwallowing, eſpecially when both Tonſils are thus diſordered at the ſame Time. 'Tis frequently very difficult, and even impracticable, to diſpoſe ſuch a Tumour of theſe Parts by the Uſe of emollient and diſ- Deſcription.

cutient Remedies: therefore to relieve the Patient of his Torment, and reſtore his Deglutition and Reſpiration, the Surgeon is obliged totally to remove or extirpate them; which may be performed either by Cauſtic, Inciſion, or Ligature.

Cure by Eſcharotics.

II. With regard to the firſt Method of removing them by Eſcharotics, great Care muſt be taken that none of the ſtronger Kinds be here uſed, leſt ſome Part of them eſcaping into the Stomach ſhould produce a Diſorder worſe than the Original. The ſtrongeſt that can be well allowed here is *Ol. Tartari P. D.* or when that fails, a Mixture of *Aqua fortis* diluted with as much Water as will juſt render it able to diſſolve a ſmall Portion of Mercury over the Fire. With theſe, or ſuch like, the Tonſils are to be touched at Intervals with a Pencil Bruſh, till they are ſufficiently conſumed. But in the Application of theſe Care muſt be taken not to touch any of the ſound Parts, as alſo not to let the Patient ſwallow any Food ſoon after, leſt ſome of the Cauſtic ſhould be carried down into the Stomach. To avoid both which, the Patient ſhould lean over the Bed or Chair with his Head inclined, that the Saliva and Cauſtic may run together out of his Mouth, obſerving to waſh and gargle his Mouth before eating. And in this Courſe the Patient muſt continue till the morbid Part of the Tonſils, or ſo much of them as will reſtore his Reſpiration and Deglutition are removed; for it would be not only tedious, but even prejudicial to remove them entirely.

Cure by Inciſion.

III. The ſecond Method uſed by the Ancients for removing ſcirrhous Tonſils is that by Inciſion or Extirpation with a Scalpel, after they have extended and brought them into View by the Hook, *Tab.* VIII. *Fig.* 2. But this Operation is not only too ſevere and cruel, but alſo too difficult in the Performance, to come much into the Practice of the Moderns, becauſe of the obſcure Situation of the Tonſils.

Cure by Ligature.

IV. The third and laſt Method of removing ſcirrhous Tonſils is by Ligature, practiſed chiefly when the diſeaſed Tonſils hangs as it were by a ſlender Stalk; in which Caſe it may be alſo extirpated without Difficulty by a Pair of Sciſſars or a Scalpel. To apply the Ligature for removing them, you are adviſed to uſe the Inſtrument, *Tab.* XXI. *Fig.* 7. which we before recommended for making a Ligature on the redundant Parts of a relaxed *Uvula*. If the Ligature is well made upon the Tonſils, they are ſaid to ſeparate in two or three Days time. The Ends of the Thread or Ligature about the Tonſils are to be ſecured or faſtened on the Outſide of the Mouth by a Piece of Plaſter, that they may not ſlip into the *Fauces*. Mr. CHESELDEN has removed ſcirrhous Tonſils of this Kind by a Ligature, which he conveyed round the Root of the Gland by a bent Probe: but in a ſcirrhous Tonſil with a broad Root, he perforated the Baſis of it with a Kind of Needle and double Thread; by tying which above and below, the Tonſil came away, as before. See his *Anatomy*, the third Edition, Page 154.

CHAP. XCVII.

Of Tubercles and Excreſcences in the Fauces, *or near the Tonſils.*

IT will not be neceſſary in this Place to give a prolix Account of the Methods for removing Caruncles and Excreſcences in the *Fauces*, or near the Tonſils; becauſe they may be, and uſually are treated in the ſame Manner as we before

before proposed for removing *Polypuses* and diseased *Tonsils*. Of the removing an Excrescence in the Palate, see ROONHUYS, *Obs.* 21.

CHAP. XCVIII.

Of extirpating scirrhous, maxillary, and parotid Glands.

This Operation neglected hitherto.

I. THOUGH we are furnished with various Methods of removing scirrhous Glands in most other Parts of the Body, yet I cannot meet with any Directions for Extirpation of the salival, maxillary, and parotid Glands, which are frequently indurated and enlarged to a monstrous Size, and which require much Care and Attention in their Removal, as they adhere to considerable Branches of the carotid Artery. What has been advanced in professed Dissertations and *Theses* on these scirrhous Glands regards their Method of Cure by Remedies, and not by Extirpation: and there are even many Surgeons and Physicians who assert the Extirpation of them to be highly pernicious, or even fatal to the Life of the Patient.

Allowed to be dangerous.

II. I must indeed rather commend than disapprove of the Aversion which many entertain against the Operation. For there are so many considerable Branches of the carotid Artery which pass through these Glands, that in extirpating them the Patient may bleed to Death, if not prevented by the Hand of a skilful Operator.

But not always fatal.

III. But it must not be imagined, that this Hæmorrhage can never be suppressed by the Hand of a prudent Operator: or if it should now and then prove impracticable, the Surgeon must sometimes engage in doubtful and dangerous Operations, to preserve the Patient from otherwise inevitable Destruction. And I can assure him I have happily extirpated many parotid and sub-maxillary Glands, which were much enlarged and indurated, and had been in vain treated a long Time with Discutients, Escharotics, and the Methods hereafter mentioned, so as to be irritated almost into a Cancer.

Method of Operating.

IV. For the Operation you must be first provided with a good Styptic Liquor, with a large Quantity of Lint, Linen Rags, and some *Bovista*, or Puff-ball, as also some thick Compresses each larger than the other, and a Roller of about six Ells long. These being provided, the Patient is to be seated against the Light with his Head and Hands secured by Assistants; and then the Surgeon opens the Integuments by a longitudinal Incision with the Scalpel, and after freeing them carefully from the Tumour, he at last divides their connecting Arteries with the Scalpel. Hereupon the Blood rushes forth so impetuously, that near a Pound will be lost before the Surgeon can lay down his Knife, and apply the Dressings. Therefore to save the Patient, and suppress the Hæmorrhage, he must instantly apply a Bundle of the linen Rags dipt in Styptic, and press them close upon the divided Arteries. The remaining Cavity of the Wound must be well filled with dry Lint and Rags pressed close with his Fingers; over which must be imposed a large Piece of Puff-ball with three or four Compresses each larger than the other, the whole being at last secured by the *Fascia nodosa* commonly used for Arteriotomy in the Temples. Lastly, you

may observe that when the Tumour is uncommonly large, it may be more convenient to make a cruciform Incision through the Integuments, by which you may extract the Tumour more easily than by a longitudinal one.

Treatment after the Operation.

V. After the Operation is concluded, and the Patient put to Bed, an Assistant ought to sit by the Bed-side, and firmly compress the Dressings on the Wound for several Hours with his Hands, the more effectually to restrain the Hæmorrhage; after which the Patient should keep his Bed quietly for three or four Days, without removing the Dressings, for fear of a fresh Hæmorrhage. The Importance of which last Caution I once experienced by relaxing the Bandage a little, through Impatience the next Day after the Operation: whereupon ensued such a violent Hæmorrhage, though the Bandage was not half off, that I thought we should have lost the Patient, who was a Girl; and I was therefore obliged immediately to re-apply the loosened Parts of the Bandage tighter than before.

Cure of the Wound.

VI. After the third or fourth Day, you may venture to remove gently the Bandage and Compresses, which will be filled with putrid Blood; and where any Parts of them adhere, you must moisten them with warm Wine or its Spirit, and then you may take off the Puff-ball, with such Parts of the Lint and Rags as are loose. This done, you must re-apply Compresses dipt in warm *Sp. Vin. camp. & Aq. calc.* and secure them with the same Bandage as at first, only not so tight, that the Patient may take his Aliment with more Ease than before. The second and third Dressings after the first should be performed every other Day, and the rest every Day, because the Discharge will be greater. But in every Dressing you ought to remove no more of the Puff-ball Lint, or Rags, than are quite loose, supplying the Place of the last with fresh Lint, spread with some digestive Ointment. And thus you are to proceed till all the Puff-ball, Lint, and Rags, are digested off spontaneously without any Evulsion, which is generally performed within eight or ten Days. The Wound must be now incarned by dressing with digestive Ointments and vulnerary Balsams, and the Cicatrisation of it finished by dressing with dry Lint only. Lastly, you ought to observe in the Operation to make your Incision behind the Jaw, that the Cicatrix may not disfigure the Patient's Face.

M. Garengeot censured.

VII. 'Tis something extraordinary that M. Garengeot, who is so ample in other Points of Surgery, should take little or no Notice of the Methods to suppress the Hæmorrhage in his Chapter on the Extirpation of scirrhous Glands. He even falsely asserts there, that you will not have any Occasion for Medicines to stop Blood in the Extirpation of those Glands or of scirrhous Breasts, because only a few Drops of Blood will be spilt even in removing the largest of these Tumours; and the Wound itself too, he says, you may heal very easily, provided you close the Lips of it well by Suture. But I think it is from hence very apparent that, in the general Doctrine of that Chapter, he had either no Regard at all to the Extirpation of scirrhous Parotids, or else he never saw the Operation performed: though he affirms he was very frequently present at the Operations of the most expert Surgeons in *Paris*. Had M. Garengeot ever been present at the Extirpation of a Parotid, he would not have affirmed it so easy to stop or restrain the Hæmorrhage, and heal the Wound. Hence we may also see the pernicious Consequence of writing in general Terms, without Specifications or Exceptions. For should any one be as careless of the Hæmorrhage in extirpating a scirrhous Parotid, as one would think he might from

M. Garen-

M. GARENGEOT's Writings, the Patient would be inevitably loſt, as happened to a Surgeon at *Jene* in this Operation[a]: though I will not deny but his Aſſertion may hold in the Extirpation of moſt other ſcirrhous Glands in the Body. We may from hence alſo conclude, that this is an unuſual Operation at *Paris:* but we meet with the Extirpation of ſcirrhous Parotids performed among the *Dutch* by ROONHUYSE (*Obſ.* I.) and TILINGIUS in his Additions to SCULTETUS (*Act.* II. pag. 39 and 54.) which were publiſhed at *Leyden* before the Year 1693.

VIII. But after all, the prudent Surgeon will not be over haſty to undertake this dangerous Operation, before the more gentle Methods have been tried in vain; becauſe we frequently find that Indurations and Tumours of thoſe Glands, both in Infants and Adults, are often diſperſed by the Uſe of proper Medicines, eſpecially when they are not inveterate, or of long ſtanding: therefore the Uſe of Medicines ſhould always be called in before the Knife. It will be often found extremely ſerviceable in theſe Tumours to bathe them every Day with ſome of the warm Oils, as the *Ol. Laterum, Saponis, Camphoræ, Succini, Juniperi &c.* defending them afterwards with a Mercurial or Soap Plaſter, to diſperſe the indurated and obſtructing Matter; which may be alſo promoted by the frequent Application of warm Bags filled with diſcutient Herbs. Cure by external Medicines.

IX. In the mean Time you muſt alſo take in the Aſſiſtance of internal Medicines, from whence the greateſt Part of the Cure is to be expected. Such are Decoctions of the *Rad. Vincetox. aut ſcrophular. cum Pulv. è Spongia uſta, Sal Gemmæ, Ant. diaphorat. &c. Calomel* and *Æthiops* I have experienced great Effects from, in theſe Caſes, obſerving to give the Patient a lenient Purge at Intervals. And when all other Remedies take no Effect, if the Patient is willing you may try a Salivation. This AGRICOLA and other eminent Phyſicians recommend, and I have in many Caſes experienced to be highly ſerviceable in removing Obſtructions and Indurations of theſe Glands. Internal Medicines.

X. If a Scirrhoſity of theſe Glands is accompanied with an Inflammation, and you cannot diſperſe the ſame, it may not be improper to ſtrive to bring it to Suppuration, and then to treat the Tumour as an Abſceſs. For I have known ſeveral Inſtances, in which ſcirrhous, parotid, and ſub-maxillary Glands, with Concretions in the Neck, having been treated with Diſcutients, in order to diſperſe them, have, by that Means, degenerated into Abſceſſes. But when Scirrhoſities of this Kind are inveterate, emollient and ſuppurative Medicines will, inſtead of digeſting them, frequently increaſe the Tumour, and at laſt convert it into a Cancer, or a malignant Ulcer: which are alſo the uſual Conſequences of treating them with Eſcharotics or Cauſtics. Theſe laſt can never be uſed withot inducing a Cancer, a dangerous Hæmorrhage, and probably the Death of the Patient, as I had lately an unhappy Inſtance in a Perſon of Quality. Treatment by Cauſtics and Suppuration.

a This Caſe is deſcribed at large in the *Commerc. Lit. Norimberg. An.* 1733. pag. 61. where the Author obſerves, that we may from thence ſee how much ſafer it is to relinquiſh than to extirpate theſe Tumours, which however ought not to deter prudent Surgeons from the Operation when abſolutely neceſſary; for I have frequently performed it with Succeſs, without loſing one of my Patients therein.

PART II. SECT. III.

Of Diſorders in the NECK, *curable by the Hands and Inſtruments.*

CHAP. XCIX.

The Method of extracting and removing ſmall Bones of Fiſh and other Animals, Plum-ſtones, Pins, and Needles, &c. *ſticking in the* Fauces *or* Gula.

AS the moſt acute Pains and Inflammation, with a Train of malignant Symptoms and ſometimes Suffocation, are frequently occaſioned by foreign Bodies ſticking in the *Fauces* or *Œſophagus*; it ought to be the principal Care of the Surgeon to remove them with all poſſible Expedition. To effect this, the Patient may be directed to a large Draught of ſome Liquor, or to forcibly ſwallow a large Mouthful of Bread, Meat, or Pulp of ſome Fruit. But if the Diſorder be rather made worſe than better by theſe Attempts, he muſt then have immediate Recourſe to ſome Inſtrument. The Tongue is to be firſt depreſſed with a Spatula, in order to obſerve whether the Obſtacle can be ſeen: and if it appears near the upper Part of the *Œſophagus*, it ſhould be cautiouſly extracted by introducing a Pair of Pliers in *Tab.* III. *Fig.* 3. or by ſome ſuch other Inſtrument. But if it is lodged deep in the *Œſophagus*, he may then give the Patient a Piece of Sponge to ſwallow that has been firſt dipt in Oil and well faſtened to a ſtrong Cord, by which it is to be pulled up again, after it has been ſwallowed by the Patient as far as it will go: by which Means the Body ſticking in the *Œſophagus* will be by the Sponge forced down into the Stomach, or elſe drawn up into the Mouth. But the ſame Intention may be anſwered better, if the oily Sponge be faſtened to a long Whalebone Probe (as at *Tab.* XXI. *Fig.* 10. BB) and then gently thruſt into and drawn out of the *Œſophagus*. This laſt Inſtrument has been ſucceſsfully uſed by myſelf, in a Countryman, who had a Bone as big as one's Thumb ſtuck in his *Fauces* above four and twenty Hours; but was by this preſſed down into his Stomach, and the Man recovered: after which I ſeveral Times experienced the Succeſs of the ſame Inſtrument in others. Some Surgeons have deſcribed and figured ſeveral other Inſtruments for this ſame Purpoſe, as HILDANUS Cent. 1. Obſ. 26. SCULTETUS Tab. VI. and GARENGEOT in his Treatiſe of Inſtruments. But if neither of them, nor the fore mentioned, are at hand, a Piece of flexible Wax-candle, of about two or three Spans long and Thickneſs of one's Finger, may be ſometimes conveniently uſed in their Stead. For other Methods of Practice and curious Obſervations on this Subject, I refer you to the *Memoires de l'Acadèmie de Chirurgie. à Paris*, 1743. pag. 444.

CHAP.

CHAP. C.

Of the BRUSH *for ſcouring the Stomach.*

RElated to the foregoing Inſtruments is the *Excutia Ventriculi* or Cleanſer of the Stomach, as it is called by ſome of our modern Phyſicians; being compoſed of ſoft Hair, faſtened by twiſted Braſs or ſteel Wire into a *Faſciculus*, as in *Tab.* XXI. *Fig.* 11. the Handle or Stem of which may be inveſted with Silk or Thread. This Inſtrument is recommended by ſeveral eminent Phyſicians as being principally uſeful to ſcower or cleanſe the Stomach as well as remove foreign Bodies out of the *Fauces* and *Œſophagus*. The Directions they give for the Uſe of it, are always to let the Patient drink a ſmall Draught of warm Water; others recommend Spirit of Wine before the Operation, that the Mucus and Foulneſs of the Stomach may be waſhed off thereby. Then the Bruſh A being moiſtened in ſome convenient Liquor is to be introduced into the *Œſophagus*, and ſlowly protruded into the Stomach by twiſting round its Wire-handle BB. When arrived in the Stomach, it is to be drawn up and down, and through the *Œſophagus*, like the Sucker in a Syringe, till it be at laſt wholly extracted. Some recommend plentiful drinking in the Operation, to be continued till no more Foulneſs is diſcharged. But though this Contrivance is greatly extolled, and ſaid to prolong Life to a great Age, eſpecially if practiſed once a Week, Month, or Fortnight: yet there are very few Inſtances of its happy Effects. And if there were, I believe few would be willing to ſuffer the Pain, Danger of Suffocation, and other Injuries which attend the Uſe of ſo offenſive an Inſtrument. More may be ſeen in this Head on a Controverſy publiſhed on the Subject, between WEDELIUS and TEICHMERIUS: In which this is demonſtrated to be no new Inſtrument, having been long before deſcribed by others.

CHAP. CI.

Of the WRY NECK.

WE ſometimes meet with People who have their Necks and conſequently their Heads diſtorted more to one Side than the other; which is by TULPIUS [a] and others termed *Caput Obſtipum*, probably after HORACE [b]. This Deformity is uſually brought into the World with the Infant, or elſe occaſioned afterwards by ſome Accident. When it is from the Birth, there is hardly any room to expect a Cure, becauſe the Vertebræ of the Neck are rendered crooked by that Poſture, while the Bones are in a ſoft and pliable State: though there are ſome ſurprizing Inſtances in TULPIUS [c], MEEKREN [d], ROONHUYS [e], of young People who have had the wry Neck from their Birth for the Space of 12, 16, or 18 Years; Riſe of the Diſorder.

[a] Obſerv. Medic. Lib. IV. Cap. 58. [b] 2 Satyr. ver. 92. [c] Loc. citat.
[d] Obſ. Chirurg. 33. [e] Obſ. Chirurg. 22 *and* 23.

notwithſtanding which, they have been reſtored to their natural Straightneſs and Uniformity. When the Diſorder comes by Accident after the Birth or in Adults, the Cauſe is uſually a Contraction of the Skin on one Side by burning, or from a Spaſmodic and a ſtrong Contraction of one of the Maſtoide Muſcles, repreſented at *Fig.* 12. A A. which at length becomes ſhorter and indurated by continuing in that Poſture: or it may proceed from a Relaxation of one or more of thoſe Muſcles, in conſequence of which the Neck will be contracted by the ſtronger antagoniſt Muſcle on the oppoſite Side. Or laſtly, it may in the Opinion of ROONHUYS proceed from a preternatural Ligament drawing down the Head. When either of theſe are the Cauſe of this Diſorder it ought not to be rejected as incurable, eſpecially if it appears to be of no long ſtanding and in a young Subject.

First Method of Cure.

II. In order to cure this Diſorder, if it be recent, and cauſed by a Catarrh or Defluxion of ſuperfluous Humours, evacuating Medicines, with the Adminiſtration of mild Sudorifics and Heat are very ſerviceable. But when it ariſes from other Cauſes, and particularly the forementioned Contraction of a Muſcle, or of the Skin by burning, the Surgeon then ought to try the Uſe of Fomentations and Ointments with emollient Oils and Emplaſters, by the repeated Application of which the contracted Parts may be ſometimes relaxed. In the mean Time the Head is to be held inclined towards the oppoſite Side by a proper Bandage for this Purpoſe. NUCKE and SOLINGEN direct us to a proper Inſtrument made of Steel with a ſoft Collar as in *Tab.* XXI. *Fig.* 13. The Collar of this Inſtrument marked A A being put upon the wry Neck, and faſtened by a Rope to the Ring C, the Patient is to be ſuſpended thereby ſeveral Times in a Day, once every Quarter of an Hour, or as often as may be convenient, till the Neck has acquired its ſtraight and natural Poſition. If theſe Means prove of little Service, as TULPIUS and ROONHUYS tell us they frequently are, or if the Diſorder is become too inveterate, the Surgeon ſhould then proceed to the Operation.

Second Method of Cure.

III. Therefore if the Diſorder proceeds from a Contraction of the Skin by burning, it will be neceſſary to divide the contracted Parts of the Skin by one or more tranſverſe Inciſions, made with great Caution to avoid wounding the jugular Vein. The Inciſions are afterwards to be dilated by dreſſing them with dry Lint, and treated with ſome digeſtive Ointments, as in other Wounds; taking Care to keep the Neck all along inclined towards the oppoſite Side by a proper Bandage, till it is ſufficiently elongated on the contracted Side by the new Supplies of Fleſh and Skin in the Inciſions, to reſtore the Head to its right Poſition.

Third Method of Cure.

IV. But if the wry Neck proceeds from a Contraction of one of the Maſtoide Muſcles, or from ſome Ligament, they are to be divided by a tranſverſe Inciſion, with the crooked Scalpel in their lower Part near the Clavicle or Sternum, taking Care to avoid any conſiderable Artery or Vein that might occaſion a dangerous Hæmorrhage. In order to ſtop the Blood after the Operation, the Wound is to be filled with dry Lint, and afterwards healed with a large Cicatrix by digeſtive Ointments, with *ol. Hyperici*, *Balſ. Capiv.* which are recommended by ROONHUYS. TULPIUS, MEEKREN, and ROONHUYS, indeed, tell us of Caſes that have occurred to them, in which the Head has immediately recovered

vered its proper Position, upon dividing the preternatural Ligament or Tendon by which it was inflected. For the rest, in all the Methods of Cure a proper Bandage seems necessary, to retain the Head and Neck in a proper Posture, till they have recovered their natural Situations: concerning which Bandage Authors are silent, as are all the modern *French* Surgeons upon this Disorder, and its Method of Cure, which seems a little surprizing. But they who desire more particular Observations on this Subject may consult Tulpius, Lib. IV. Cap. 58. with Meekren, Cap. 33. and Roonhuys Obs. 22, 23.

CHAP. CII.

Of Bronchotomy, Laringotomy, *or* Tracheotomy.

I. By all these Names is intended an Opening or Incision made in the *Aspera Arteria* or Windpipe: which is necessary in many Cases, and especially in (1) a violent Quinsey, to prevent Suffocation from the great Inflammation or Tumor of the Parts. (2) When a Bean, Pea, Plumb, or Cherry-stone or some such Bodies are slipt into the Trachea, and seem to threaten Suffocation: (3) And lastly, this Operation may be practised upon People that have been lately drowned, and are not yet entirely suffocated: for by dividing the Trachea and inflating Air into the Lungs of such Persons several have been recovered. I am not altogether ignorant that many Physicians are averse to this Operation, either esteeming it dangerous, deadly, or inhumane. But those Gentlemen are greatly mistaken: for the small Wound made in the Trachea by this Operation, is so far from killing, that even much larger, which are not made with this Intention, are not to be judged mortal, as we intimated in treating of Wounds in this Part. So that we cannot help thinking with Cassbrius, that those are both ignorant and timorous, who rashly neglect this safe, easy, and often salutary Operation in the forementioned Cases. In what Cases this Operation is necessary.

II. When this Operation is to be performed, the most convenient Part of the *Trachea* to be opened, is between the second and third of its annular Cartilages: though it may be also opened much lower without Danger. The Method of proceeding, especially when any Stone, Bean, Pea, or the like, are to be extracted, take as follows. In the first Place, the Patient is to be inclined backward upon a Bed or in a Chair, and his Head held firm by an Assistant, who is to stand at his Back: then the Skin, Fat, and Muscles, are to be divided by making a longitudinal Incision with a Scalpel according to the Length of the *Trachea*, beginning about two Fingers Breadth below the Scutiform Cartilage, and continuing it for the Space of two, three, and in tall People four Fingers Breadth. See *Tab.* XXI. *Fig.* 14. AA. Then the Sides of the Wound are to be drawn asunder by an Assistant, either with proper Hooks or his Fingers, and after wiping off the Blood with a Lint or a Sponge to render the *Trachea* conspicuous, three or four of its annular Cartilages are to be divided in a right line: by which Means the Body lodged in its Cavity may be found by searching with a Probe, and afterwards extracted by a Hook or Pliars. The Manner of extracting Bodies out of the *Trachea*.

When the Operation is finiſhed, the Wound is to be cleanſed with a Sponge, and dreſſed with ſome ſticking Plaſter, retained by Compreſs and Bandage: and afterwards it may be treated with ſome vulnerary Balſam, as mentioned in our treating of Wounds in this Part. By theſe Means I happily extracted a Piece of a boiled Muſhroom, which ſlipped into the *Trachea* of a jocoſe Man at *Helmſtadt*, with Danger of Suffocation by Laughing, while he was eating Broth, in which Muſhrooms were boiled. By the ſame Method RAVIUS told me he happily extracted a Bean which had fallen into the *Trachea*; notwithſtanding the reſt of our modern Surgeons are negligent on this Head. Some Surgeons advice that Kind of Suture which is uſed in the Hare-Lip for the more ſpeedy and uniform Cicatriſation of the Wound in this Part. But in my Opinion that Apparatus may be properly omitted, as it uſually gives great Pain and Uneaſineſs to the Patient, and as the Wound may be cured by a Treatment much milder and equally ſafe.

How *Bronchotomy* ſhould be performed in a Quinſey.

III. When repeated Bleeding and the Uſe of proper Medicines take no Effect in a Quinſey, this Operation may be neceſſary to prevent the Patient from being ſuffocated. In this Diſorder there are three Ways of performing *Bronchotomy*, each of which we ſhall deſcribe in order. The firſt is by placing the Patient in a ſupine Poſture, his Head being held firm by an Aſſiſtant, as before. The Surgeon then proceeds to make an Inciſion in the Integuments to the *Trachea*; or the Skin may be elevated by the Surgeon and an Aſſiſtant, and afterwards divided longitudinally together with the Fat and Muſcles which cover the *Trachea*. Some adviſe theſe Muſcles to be cautiouſly ſeparated from the *Trachea* or from each other: but that is not neceſſary, and theſe Muſcles may be ſafely inciſed without Danger. When the Integuments have been divided, the Wound is to be cleanſed, and the Blood ſtopped with a Sponge which has been dipt in warm Wine or its Spirit, while the Aſſiſtant draws one Side of the Wound from the other, with Hooks or his Fingers. Then the Surgeon makes an Inciſion with his Scalpel between two of the annular Cartilages, or elſe, as I have ſometimes ſeen, by dividing one of the Cartilages in the Middle, at the ſame Time; after which he may eaſily introduce a ſmall round or flat Tube of Silver or Lead, as we have repreſented in *Tab.* II. *Litt.* TUX. But before the Surgeon withdraws his Knife out of the Inciſion, it may be proper for him to inſert a Probe by the Side of it, by which Means he may afterwards more eaſily introduce the Cannula. This Cannula or Tube is to be faſtened to the Neck with a Ligature paſſing through Rings or ſmall Holes in its Side, and held firm in its Place by a Piece of perforated Emplaſter, being careful that the End of the Tube does not touch the back Part of the *Trachea*, and occaſion a troubleſome Cough. But to prevent the external Cold and Duſt from injuring the Lungs, it may be proper to let the Air paſs through a Piece of Sponge in the Tube, which ſhould be frequently dipt into, and expreſſed out of warm Wine; or, as GARENGEOT adviſes, through a Piece of fine Lint, having a Piece of perforated Emplaſter behind it. This being performed, the Patient may be bled in the Arm, Foot, Neck, or under the Tongue: and Clyſters, Gargles, with a Cataplaſm under the Chin, cupping on the Sides of the Neck, with other Medicines proper in Quinſeys, ſhould be diligently applied, till the Patient either recovers his Reſpiration or wholly expires, one of which uſually happens within four Days after the Operation. When a free Reſpiration

ſpiration by the Mouth ſucceeds two or three Days after the Operation, which may be known by ſtopping the Orifice of the Tube with a Finger, it may be then taken out, and the Wound afterwards dreſſed and treated as we before directed. But if the Difficulty of Reſpiration ſtill continues, it ſhould be continued in its Place with the other Remedies, till Death or a free Reſpiration puts a Period to the Experiment.

The ſecond and third Way of performing this Operation.

IV. Another and more ready Way of opening the *Trachea* is by inſerting a double edged Scalpel, at one and the ſame Time, through the Skin, Fat, Muſcles, and Trachea itſelf: after which a proper Tube may be introduced and retained as before. By this Method the Operation may not only be performed in a much ſhorter Time, but the Wound will be made much leſs and the ſooner healed. The third and laſt Method of *Bronchotomy* is by an Inſtrument conſiſting of a ſmall Tube, in which is contained a triangular Needle called a Trochar, repreſented in *Tab.* XXI. *Fig.* 15, 16. This Inſtrument is ſo managed, as to paſs through the Middle of the *Trachea* by one puſh, and after drawing out the Needle from the Tube, the latter is left in the Wound till the Patient recovers. This Method much exceeds the reſt, as it may be more eaſily and expeditiouſly performed, and occaſions the leaſt Wound and Pain to the Patient. The Dreſſings, *&c.* are to be performed the ſame here as in the firſt.

The Operation ſhould be timely performed.

V. We muſt not here neglect to adviſe the Performance of this Operation in Time, while there is ſufficient Strength and Hopes of the Patient's Recovery; for when the Patient is ſpent, it is uſually performed in vain. We may alſo add, that it will be prudent to call in the Aſſiſtance of ſome eminent Phyſicians before the Operation be undertaken, in dangerous Caſes. Otherwiſe the Surgeon might ſuffer in his Character, by the Declamations of thoſe ignorant of his Profeſſion, who, from the Singularity of the Operation, may ſometimes, in unſucceſsful Caſes, give out that he has cut the Patient's Throat or killed him.

The Method of recovering ſuch as have been drowned.

VI. If a drowned Perſon has but juſt expired, or not continued long under Water, the moſt certain and expeditious Way of recovering him will be by opening the Trachea with a Scalpel or ſuch other Inſtrument as is neareſt at Hand, and afterwards to inflate or blow into his Lungs either with the naked Mouth (as Delay is dangerous) or elſe with a Tube. For by this Means, if timely adminiſtered, the Breath and Life of a Perſon thus ſuffocated may be ſurprizingly reſtored, as DETHARDINGIUS, preſent profeſſor of Phyſic at the *Hague*, has lately declared in a particular Diſſertation upon this Subject.

Concerning the true Name and Writers of this Operation.

VII. As this Operation is performed neither in the *Larynx* or *Bronchia*, but in the *Trachea* or *Aſpera Arteria*, it ought not to be called Bronchotomy or Laryngotomy, as it commonly is by the Generality of Phyſicians or Surgeons; but *Tracheotomy* from the *Trachea*. This Operation has been treated of in a particular Diſſertation by FRID. MONAVIUS and SCHACHERUS Profeſſor at *Leipſick*. JULIUS CASSERIUS has alſo deſcribed and illuſtrated this Operation with elegant Figures in his Treatiſe *de Vocis Auditusque Organis*, p. m. 119. RENATUS MOREAU and TH. FIENUS have diſcourſed learnedly on this Operation, the firſt in his Epiſtle *de Laryngotomia*, and the laſt in his Book of Surgery.

CHAP.

CHAP. CIII.

Of ſtrumous or ſcrophulous TUMORS *and* BRONCHOCELE.

Struma what it is, and its Cauſe.

I. ALMOST any Kind of Tumor which is formed in the anterior lateral Parts of the Neck near the Skin is uſually denominated ſtrumous or ſcrophulous: though there is a great Variety and Difference in the Nature of theſe Tumors, ſome being ſmall, ſome of a moderate Size, and others ſo much enlarged as to cauſe Stupidity: Some are ſoft or moveable, others hard or immoveable; ſome of a mild Nature, and others of a malignant or cancerous Diſpoſition. But with Regard to the Cauſe of theſe Tumors, they are uſually formed of indurated Glands in the Neck, as the ſmall moveable Glands, the ſuperior and inferior ſalival Glands, and ſometimes the thyroide Glands, which are by ſome ſtrictly called Scrophulæ or the Evil, by the *French Ecrouelles*. Some of them are related to encyſted Tumors, and therefore contain a hard or ſofter Subſtance like Cheeſe, Suet, or Lard. But if a Tumor ariſes in the anterior Part of the Neck from the reſiſting Flatus or Air, ſome Humour, or other Violence, as ſtraining in Labour, lifting of Weights, *&c.* the Diſorder is then uſually called a Bronchocele. In my Opinion it ſhould rather be termed *Tracheocele*. It is remarkable, that ſome Nations are quite free from this Diſorder, while others are grievouſly afflicted therewith: among which latter we may reckon the Inhabitants of *Spain*, *Germany*, *Sweedland*, *Bavaria*, *France*, *Helvetia*, and eſpecially the Inhabitants of *Tirole*, who have theſe Tumors (but flaccid) ſometimes in ſuch a Degree, that they extend to their Navel, even down to their Knees. See MITTERMEYER's Treatiſe on ſtrumous and ſcrophulous Swellings. The Cauſe of which Peculiarity in the Spreading of this Diſorder among certain People, is ſuppoſed to reſide either in the Air or Waters of thoſe Countries: but in what Manner they operate to produce thoſe Effects has not yet been explained by phyſical Writers, though we are furniſhed with many ſpecious Conjectures and Opinions. Theſe Tumors riſe in various Parts of the Neck of ſome Women after a difficult Labour. There is another Difference in ſcrophulous Tumours, that ſome are milder and without any Pain, while others are inflamed, painful, or indurated, ſo as to be ſcirrhous, and in ſome Meaſure cancerous, obſtructing the Office of Reſpiration and Deglutition. But of what ever Kind theſe Tumors are, when they are once become inveterate, they are very difficultly, if ever curable by Medicines: but if they are recent, they may be ſometimes diſperſed, eſpecially when the Tumor is from an Induration of the Glands. We are informed that the *French* and *Engliſh* Kings have poſſeſſed a very eaſy Method of curing this Diſorder, barely by touching the Parts affected. But we have not Opportunity at preſent to enter minutely into this Matter; they who are deſirous of more, may conſult LAURENTIUS in his Treatiſe *de mirabili Strumas ſanandi vi, ſolis Galliæ Regibus divinitus conceſſa:* as alſo JOHN BROWNE in his Treatiſe of ſtrumous Glands, where he vindicates the Right and Virtue of the regal Touch to belong to the Kings of *England*, adding many Examples for the Confirmation thereof.

II. In

II. In order to cure ſtrumous or ſcrophulous Tumors of the recent Kind, nothing is more conducive than a proper Regimen of Diet and Way of Living, eſpecially when aſſiſted with a good Air and the Uſe of internal Medicines, ſuch as Diſcutients, Attenuaters, and cooling Purges, ordered according to the Age and Conſtitution of the Patient, as we before adviſed at *Chap.* XCVIII. in treating of ſcirrhous Glands in general, and particularly of the ſalival Glands. The celebrated Mr. BOYLE greatly extols the *Ruta Muraria* as a Specific in theſe Diſorders. SCULTETUS recommends *pulv. lacertarum* macerated in Water, and afterwards dried; or *pub. ex. rad. zinzib. turpeth. & ſaccharo.* Some preſcribe *burnt Sponge*, or *pulv. ad ſtrumas:* Others, *rad. Schrophular*, or *Decoct. lign. cum rad. Bardano.* But the internal Means ſhould alſo be aſſiſted by a diſcutient Ointment externally: as Treatment of recent Strumæ.

℞ *Merc. Crud.* ʒi. *Terebinth Venet.* ʒii. *Subacti, Axung. Porcinæ, quantum ſufficit pro Ung.*

This Ointment ſhould be rubbed in upon the Tumor every Day for a conſiderable Time, applying afterwards *Empl. de ranis cum Mercurio, de Cicuta*, or *Diaſaponis.* But during the Uſe of theſe it will be proper to give the Patient a gentle Purge once a Week, to prevent the Mercury from cauſing a Salivation. SCULTETUS and FABRICIUS AB AQUAPENDENTE greatly extol the following Ointment in this Diſorder.

℞ *Ol. Laurin.* ʒi. *Alumin. Rup.* ℥ *ſs. Sal. commun.* ʒii. *m. f. Ung.*

Inſtead of which, others uſe the *Ol. Philoſoph.* or *Petrolium alb.* either alone or mixed with *Ol. Sapon.* There are alſo good Effects promiſed from wearing a leaden Collar that has been mixed with Mercury, eſpecially when the ſcrophulous Tumor or Bronchocele are recent: at leaſt it prevents them from growing bigger, if it does not entirely diſperſe them. There are ſome who adviſe to rub the Tumors well with the Hand or a Bone of a dead Man; and others direct to more ſuperſtitious Means, which they ſuppoſe to act by Sympathy. But we muſt frankly own, our Opinion is, there can be little or nothing in ſuch a Practice.

III. If the ſtrumous or ſcrophulous Tumor is of long ſtanding, but moveable, it may be then better removed by the Knife than by Medicines. The moveable Tumors of this Kind may be extirpated by the Scalpel, while thoſe which are fixed and lie deep in the Neck, cannot be ſafely removed without Prejudice to the Patient, unleſs they happen to be of the ſofter Kind. In extirpating theſe Strumæ or Scrophulæ, there is no ſmall Danger of wounding ſome of the large Arteries, Veins, or Nerves of the Neck by the Scalpel, which would occaſion Death or ſome very bad Symptom. GARENGEOT and PETIT affirm that no ſcirrhous or indurated Glands detach any Roots into the adjacent Parts, notwithſtanding they appear to be fixed or immoveable, and that therefore the immoveable Kind of Strumæ may be ſafely extirpated. But as they produce no Inſtances of Succeſs from this Opinion, there is no doubt but it will be rejected as precarious by the Generality of prudent Surgeons. For the Extirpation of moveable Strumæ there are three Methods chiefly in Uſe: the firſt of which is by Ligature, when the ſtrumous Tumor hangs by a ſlender Part like a Stalk, Treatment of inveterate Strumæ.

which

which is not very frequent. But if the Tumor is not pendulous, or if it be connected by a large Root, it is then to be removed by the ſecond Method with a Scalpel. In order to this a cruciform Inciſion is to be made upon the Middle of the Tumor down to its proper Integument: then the wounded Parts are to be ſeparated by the Knife from the Tumor, which is to be afterwards taken hold of by the Hook, Needle, and Thread, or a convenient Pair of Pliers, and by that Means taken out as we have directed before, in treating of encyſted Tumors. During the Operation an Aſſiſtant is to dry up the Blood from the Orifice of the Wound, by repeated Applications of Lint or Sponge, that the Surgeon may have a clear View of his Work: and if by Accident a large Blood-veſſel ſhould be divided with the Root of the Tumor, it is to be cloſed by applying *Sp. Vin. Rect.* or ſome ſtyptic and aſtringent Medicine; and if theſe fail, a Ligature or actual Cautery. And laſtly, the divided Parts of the Skin are to be brought cloſe to each other by a Piece of ſticking Plaſter, and placed uniform, ſo as to unite without leaving a diſagreeable Cicatrix: the Remainder of the Treatment may be conducted as in other Wounds. I have ſeveral Times opened ſome of the ſofter Strumæ or Scrophulæ either with a Scalpel or Cauſtic, and after diſcharging their Contents and cleanſing the Ulcer, have performed the reſt of the Cure as in other Wounds. As theſe Tumors are uſually without Pain, it is not at all ſurprizing that they ſhould be neglected by the Generality of People, who are both poor, careleſs, and fearful of the Surgeon's Hand; and that more eſpecially, if they think the Tumour and Ornament, like the Inhabitants of *Tyrole*. If a Patient ſhould be deſirous of being freed from this Diſorder without the Knife, it may be done with Cauſtics [a]; as we have directed in Tubercles and Excreſcences. But you muſt be careful not to undertake this Method of Cure, in any but the more ſoft and mild Kind of Strumæ, ſeated not near any large Veſſel nor too deep in the Neck: otherwiſe the Tumor may be converted from a ſtrumous to a cancerous Diſpoſition, or at leaſt malignant Symptoms brought on, which would endanger the Patient's Life, by injuring the large Veins, Arteries, Nerves, or Trachea ſeated in thoſe Parts.

CHAP. CIV.

Of SETONS.

First Way of making a Seton.

I. A Seton is a few Horſe-hairs, ſmall Threads, or a larger Packthread, drawn through the Skin, chiefly of the Neck, by Means of a large Needle or Probe, with a View to reſtore or preſerve Health. There are chiefly three Methods of performing this Operation practiſed by Surgeons. The firſt is by taking up the Skin in the lower Part of the Neck, while an Aſſiſtant draws it tight about an Inch above, then the Surgeon paſſes through the Skin a large and crooked Needle (*Tab.* XVIII. *Fig.* 12. or XXII. *Fig.* 9.)

[a] Some reject Cauſtics altogether, but very unreaſonably; for they are often of great Service, if judiciouſly applied. CELSUS recommends them as excellent Remedies in theſe Diſorders. *Lib.* vii. *c.* 13.

with

with a Silk or Thread, either twiſted together into a large String, or in 20 or 30 ſmall and looſe Threads: which being drawn through the Skin are to be left in the Neck after the Needle has been removed (*Tab.* XXI. *Fig.* 17.) The Wound is then dreſſed with ſome digeſtive Ointment, and covered with a Piece of Plaſter, perforated on each Side for the Ligature to paſs through: and thus the Seton is decently compleated. The Name ſeems to be derived from *Seti Equini*, or Horſe-Hairs; which were by the Ancients uſed inſtead of Thread. But our Modern Surgeons changed them for Thread of Silk or Flax, which are much more eaſy to the Patient. The Ligature is to be ſhifted or drawn through the Wound a little every Day, and the Matter is to be wiped off every Morning and Night as in Iſſues; by which Means it will degenerate into an Ulcer with a double Orifice, making a copious Diſcharge daily: and when one Ligature is become foul and unfit for Uſe, a freſh one may be introduced by faſtening it to the End of the old, which may be then drawn out.

Second Method.

II. The ſecond Way of making a Seton differs little from the former, only inſtead of a large Needle a double edged Scalpel or Lancet is made uſe of (*Tab.* I. *Litt.* B or I) and having faſtened the Ligature to a Probe, it is thereby to be introduced through the Wound: by which Means a larger Aperture is made with a Knife than with a Needle, and a larger Quantity of Matter thereby diſcharged. One of the beſt Inſtruments for this Operation is exhibited in *Tab.* XXIII. *Fig.* 5. which ſhould be fitted with a Handle; and after it has been forced through the Skin to the Part B, and the Ligature drawn out of the Aperture or Eye marked A, it may be again drawn back out of the Wound, leaving the Ligature behind.

Third Method.

III. The third Manner of performing this Operation is by an Inſtrument for the Purpoſe, deſcribed and repreſented for the Purpoſe by HILDANUS, FABRIC. AB AQUAPENDENTE, SCULTETUS, and others; by which the Skin is pinched up, and perforated with a ſharp-pointed and red-hot Iron, after which a Ligature is introduced as before. As this Operation is attended with great Pain and conſequent Suppuration, it is not at all ſurprizing that it ſhould be approved of by many eminent Phyſicians, to make a ſtrong Revulſion and copious Diſcharge of offending Humours from the Head, Eyes, and more noble Parts.

Setons ſometimes made longitudinally.

IV. Some have been and are of Opinion that a Seton made longitudinally according to the Length of the Neck, is much more efficacious than the tranſverſe. But I could never obſerve any material Difference, though I have ſometimes deſignedly uſed this Way of operating: in which I always found much more Difficulty, becauſe the Skin cannot be ſo eaſily taken up, nor the Scalpel or Needle introduced in the longitudinal, as it may in the tranverſe Direction. In this Method, the Head is to be inclined backward, the Skin taken up, and perforated by a very crooked Needle (*Tab.* XXII. *Fig.* 9.) which may be done better by holding the Skin up with a Pair of Pliers rather than the Fingers, eſpecially thoſe made for the Polypus (*Tab.* XIX. *Fig.* 10.) being perforated with an oblong Aperture near the Extremity of their Mouth.

The Uſe of Setons.

V. There are many Phyſicians and Surgeons who eſteem Setons to be of little Conſequence in the Cure of Diſorders, eſpecially DIONIS and GARENGEOT: whereas others, on the contrary, propoſe it to be one of the beſt Means

of relieving many chronical and obſtinate Diſorders, particularly thoſe of the Head; ſuch as Drowſineſs, Head-achs [a], Epilepſy, and Diſorders of the Eyes. And as it is certain many ſuperfluous and pernicious Humours may be drawn from the Parts affected, and be this Way diſcharged, we need not wonder that a Seton ſhould be preferred by many Phyſicians as more effectual than a Pair of Iſſues. We alſo find, by Experience, that they are very uſeful in the Hydrocephalus, Catarrhs, Inflammation, and other Diſorders of the Eyes, Gutta Serena [b], Cataract, and incipient Suffuſion: to which we may add intenſe Head-achs, with Stupidity, Drowſineſs, Epilepſies, and even the Apoplexy itſelf. But as Setons are uſually attended with much Uneaſineſs and Trouble, their good Effects are but ſeldom experienced by Patients in thoſe Diſorders.

PART II. SECT. IV.

Of Diſorders of the THORAX, *coming under the Province of Surgery.*

CHAP. CV.

The Manner in which the Nipples of the BREASTS *in Women may be drawn out, extended, and milked.*

I. THE Nipples of ſome young Women who have never lain in before, are frequently ſo ſmall and ſunk into the Breaſts, that the new-born Infant cannot lay hold of them, ſo as to ſuck out the Milk. In this Caſe, it may be neſſary to apply an Infant that can draw much ſtronger, or has been uſed to ſuck, or elſe an adult Perſon, who is expert in this Practice. But if neither of theſe can be conveniently obtained, and the Infant does not draw out the proper Quantity of the Milk, it may be then more decent as well as convenient to apply an Inſtrument adapted to this Purpoſe. Such is, 1. A ſort of Glaſs repreſented in *Tab.* XXI. *Fig.* 18. the larger Part of which marked A is to be applied like a Cupping-glaſs upon the Nipple, and the Tube BB is to be ſucked in the Patient's own Mouth. This ſhould be repeated, till the Nipples are ſo much extended, as to be eaſily taken hold of and ſucked by the Infant. 2. If none of thoſe Glaſſes are at hand, the ſame Intention may be anſwered by applying a Tobacco-pipe in like Manner. 3. Others apply a ſmall Cucurbite made of Ivory or Alabaſter in the Form of a Hat, as at *Fig.* 19. which they ſuck ſtrongly in their Mouth. 4. I have by me another Sort of

[a] RUYSCH gives us a remarkable Inſtance of an inveterate Head ach, that ceaſed upon the Application of a Seton; on removing the Seton the Pain returned, and this ſeveral Times ſucceſſively. See *Obſerv.* 40.

[b] In SCULTETUS we have the Caſe of a young Woman, who was cured of a *Gutta Serena*, by Means of a Seton: when all other Methods had been tried in vain, as frequent Bleeding, Purging, and Iſſues. See his *Obſerv.* 25.

Glaſs,

Glaſs, which may be called a ſucking Glaſs, repreſented at *Fig.* 20. this being made hot with warm Water, or held before a Fire, ſo as to rarify and expel the Air, and its Mouth A applied over the Nipple, it will be not only extended or drawn out, but will alſo diſcharge a conſiderable Quantity of Milk, which will take down the Inflammation and Tumor of the Patient's Breaſt. When the ſucking Power of the Glaſs is grown very weak, the Milk may be let out at the Aperture B which was before ſtopped up with Wax: and after heating the Glaſs again, as in Cupping, ſtopping up the Hole again with Wax, it may be applied ſucceſſively as long as may be requiſite. Laſtly, young Whelps, who have not yet any Teeth, have, by ſome, been applied with Succeſs for the ſame Intention.

CHAP. CVI.

Of chapp'd and ſore NIPPLES.

IT is a common Calamity of lying-in Women, who ſuckle their own Children, to be troubled with Fiſſures and Ulcerations in their Nipples, attended with great Pains. They will receive the moſt Benefit from the Application of *Mucilag. ex Sem. Cydon.* or a Mixture of *Ol. Over. & Ceræ*; or laſtly, a fine Powder of *Gum. Tragacanth. vel Arabic.* which may be ſprinkled on through a Piece of Muſlin, as there may be Occaſion. But then the Infant ſhould ſuck the ſore Nipple as ſeldom as poſſible, that it may heal without Interruption: and the Shift or Linen ſhould be alſo kept from adhering to it. In order to which, when the Infant has done ſucking, the Nipple may be waſhed in a Solution of *Sacch. Saturn. in aq. Plantag.* defending it afterwards with a Cap of Ivory, Marble, or White-wax, like that in *Tab.* XXI. *Fig.* 19.

An EXPLANATION *of the* TWENTY FIRST PLATE.

Fig. 1. Repreſents the Manner of dividing the Frenulum of the Tongue in Infants by the Scalpel.

Fig. 2. Shews how the ſame is to be done with a Kind of Fork and Pair of Sciſſars.

Fig. 3. Is the Fork itſelf, in its true Size, to hold up the Tongue in that Operation.

Fig. 4. and 5. Are thin Plates of Gold or Silver to ſupply the Loſs of any Part of the Palate-bones, having a Piece of ſoft Sponge faſtened to them in the Part a a.

Fig. 6. Repreſents the braſs Inſtrument of HILDANUS, to take off the Uvula by Ligature. AA is the Thread or Ligature properly diſpoſed and faſtened in the Inſtrument; B, the Part which takes hold of the Uvula; C, that Part of the String to be drawn by the Hand. But the Inſtrument itſelf is figured three Fingers Breadth leſs than it really is.

Fig. 7. Is a braſs or ſteel Wire furniſhed with an Aperture A, to convey the String through the preceding Inſtrument, to the Size of which it ſhould be proportioned. B, its Handle.

Fig. 8. Repreſents an Inſtrument to make an Abſciſion of the Uvula. A, the Part which is to receive the Uvula; BB, the Handle by which the Scalpel C is thruſt forward to cut off the Uvula, DDD, is the Handle of the whole Inſtrument to be held in the left Hand.

Fig. 9. Is an Inſtrument that may be called *Pariſthmiotomus*, ſerving to ſcarify the Tonſils when inflamed, or open them when ſuppurated. A, the concealed ſcarificator; B, the Handle by which it is to be moved in that Work; C, the Handle by which the Inſtrument is to be held firm in the Operation. This Inſtrument is figured two or three Fingers Breadth leſs than it really is.

Fig. 10. Is a Probang or long Probe of Whalebone marked BB, furniſhed with an oily Sponge AA, to remove ſmall Bones or Splinters out of the Gula.

Fig. 11. Is a Scowering-bruſh for the Stomach. AA, the Bruſh-part of fine Hairs; BBB, the Handle of twiſted Braſs Wire, covered with Silk, by which it is to be introduced into the Stomach and drawn out again.

Fig. 12. Exhibits the wry Neck. AA, the two maiſtoide Muſcles, which are to be divided in their lower Part, when preternaturally contracted.

Fig. 13. Repreſents an Inſtrument to ſtraighten the wry Neck. A, the Collar lined with Fur, to be put about the Neck; BB, an Iron Arch furniſhed with the Ring C, by which the Patient is to be ſuſpended.

Fig. 14. Exhibits the Part and Manner of dividing the Integuments in *Tracheotomy*.

Fig. 15. Repreſents a Kind of Trochar to perforate the *Aſpera Arteria* in Bronchotomy.

Fig. 16. Is another of thoſe Inſtruments contrived by DEKKER. AA, the Bodkin, whoſe Point coming through the Tube introduces it into the Trachea, where it is left after the Bodkin is extracted.

Fig. 17. Denotes the Part of the Neck for the tranſverſe Seton.

Fig. 18. Is a Glaſs-inſtrument, whoſe Bowl A, being applied upon the Nipple, and the Tube BB in the Patient's Mouth, the Nipple and Milk may be drawn out.

Fig. 19. Is a little Cucurbite of Ivory or Alabaſter to draw out ſmall Nipples, and cover them when excoriated.

Fig. 20. Is a ſucking Glaſs to draw out the Milk, by rarifying the internal Air with Heat.

CHAP. CVII.

Of a Cancer in the BREASTS.

Deſign of this Chapter.

I. WE have before obſerved (in *Part* I. *Book* IV. *Chap.* IV.) that the Breaſts, eſpecially thoſe of Women, are not only ſubject to Inflammation and Ulceration, but alſo to become ſcirrhous and cancerous. But how the firſt are to be treated, we have before declared in the Place now mentioned. We have alſo explained (in *Part* I. Book IV. *Chap.* XVII.) the Cauſes which may produce a Cancer, the Manner of its Increaſe, with its conſequent Symptoms and diagnoſtic Signs, together with the Medicines proper through the whole Courſe

Fig. 1.

Fig. 2.

Fig. 4.

Fig. 5.

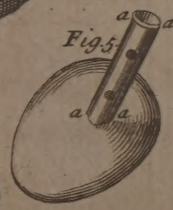


Fig. 15.

Fig. 16.

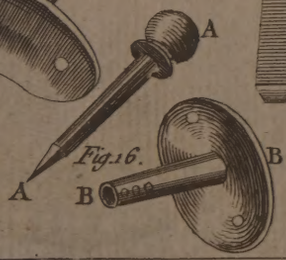


Fig. 3.

Fig. 6.

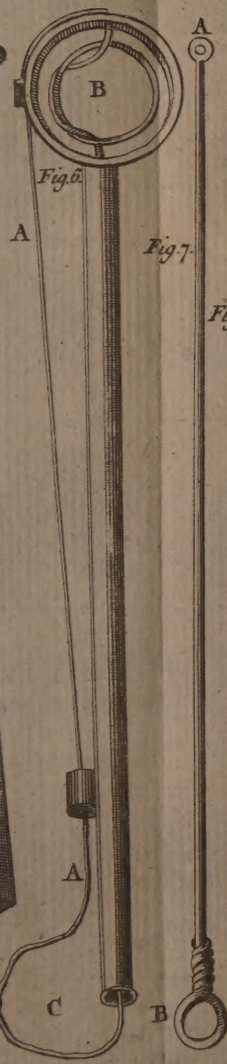


Fig. 7.

Fig. 9.

Fig. 10.

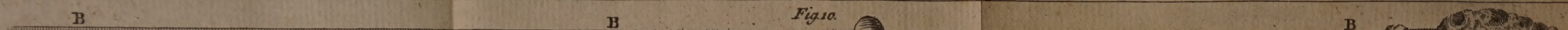


Fig. 8.

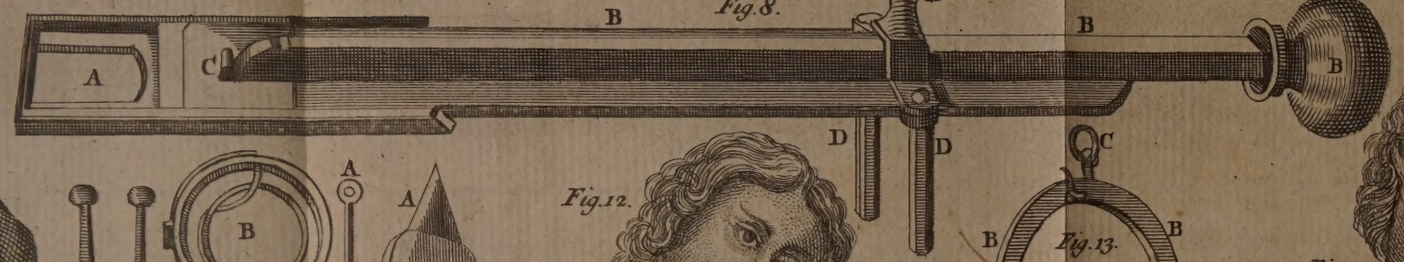


Fig. 12.

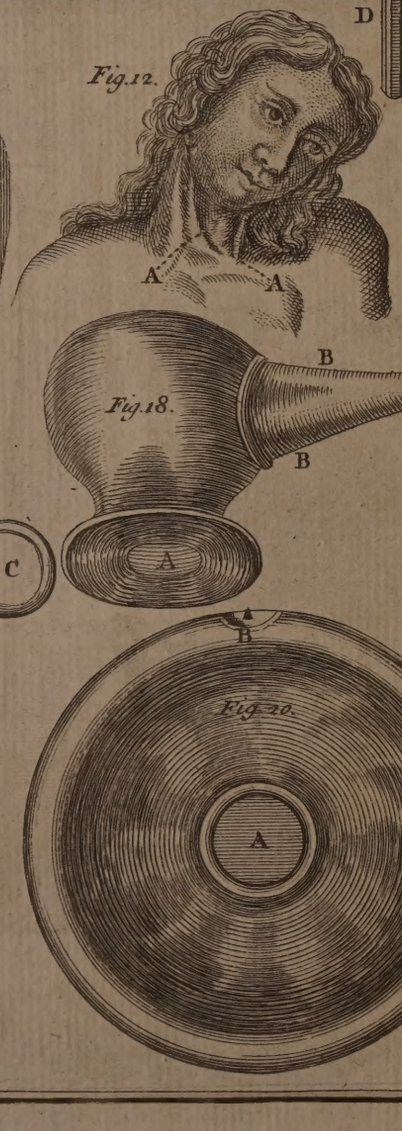


Fig. 13.

Fig. 14.

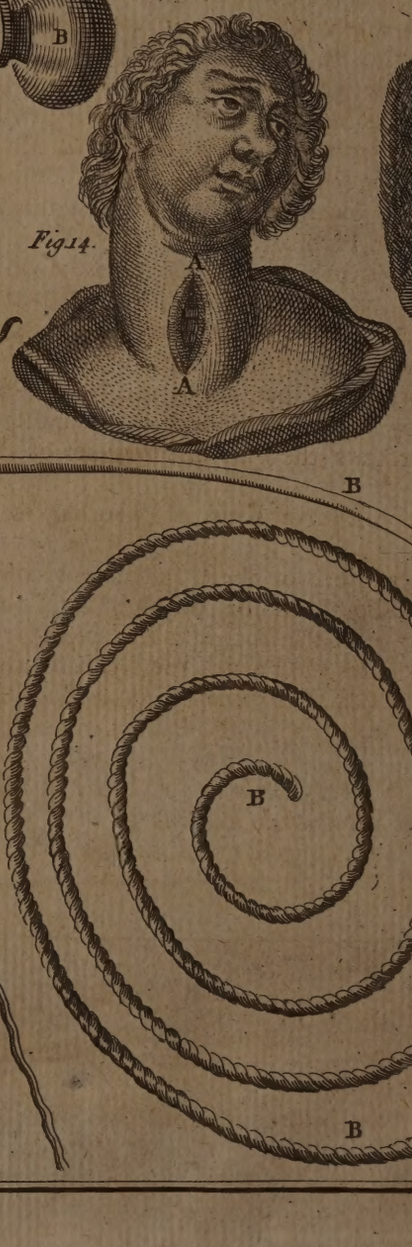


Fig. 11.

Fig. 18.

Fig. 20.

Fig. 17.

Fig. 19.

J. Mynde sc.

Courſe of the Diſorder. It therefore now remains to deſcribe the Operation, by which a cancerous Breaſt is to be extirpated, when other Medicines have no Effect. And I am well convinced by Experience, that Cauſtics properly applied will often extirpate theſe Cancers, eſpecially of the ſmaller Size: but they will not always ſucceed.

The Manner of extirpating a latent Cancer, not yet ſpread thro' the Breaſt.

II. Before we proceed to an Operation ſo important, it may be firſt neceſſary to enquire whether the adjacent axillary Glands are indurated only, or whether they are infected, and communicate with the Cancer. For in that Caſe, extirpating the Breaſt will not cure the Patient: but the Virus of the Cancer, which lies concealed in the other Parts, will make the ſame Diſorder break out again in a ſhort Time. Though there are ſome Inſtances, where the axillary Glands have been indurated, and the Patient cured of the Cancer by extirpating thoſe Glands together with the Breaſt. Before the Surgeon proceeds to this Operation, he ſhould firſt prepare his Patient for it by a proper Diet and Way of Living, that the Cancer may not be too large and immoveable. When he finds it in that Condition, occupying but one Part of the Breaſt, as in *Tab.* XXII. *Fig.* 1. AB, the Patient ſhould then be placed in a high Chair, and the Arm belonging to the affected Breaſt ſhould be either held downward and backward extended, or faſtened to the Chair in that Poſture with a Ligature; by which Means the pectoral Muſcle will be flattened or expanded, and more eaſily ſeparated from the diſordered Part of the Breaſt. It is then the Practice of many, to make a large cruciform Inciſion upon the Integuments of the Cancer, which being carefully ſeparated by the Scalpel, and the Cancer freed from the ſound Parts on every Side, is then extracted, which may be done commodiouſly by paſſing a large Needle *Tab.* VI. *Fig.* 5, 6. with a Ligature: or the diſordered Part may be elevated by a Hook only, repreſented in *Tab.* VIII. *Fig.* 2, 3. For my own Part, I have often extirpated Cancers bigger than one's Fiſt, which have extended from the Nipple to the Shoulder, in the Manner repreſented by *Tab.* XXII. *Fig.* 1. AB, which have been cut off, by no other Inſtrument than the Scalpel *Tab.* XII. *Fig.* 14. in a ſtraight Direction. After an exact Separation of the morbid from the ſound Parts, the Wound has been healed in the Manner exhibited by *Tab.* XXII. *Fig.* 2. but where the Integuments are alſo affected and ſtrictly joined to the Cancer, there will be little room to expect a perfect Cure, if they are not both cleanly extirpated together.

What is to be done after the Operation.

III. Immediately after the Operation, it may be convenient to let the Wound bleed a few Ounces according to the Strength of the Patient, if they are not of a weak and infirm Habit, which may prevent a freſh Hæmorrhage, Inflammation, or Fever. Nor is it neceſſary to apply an actual Cautery to ſtop the Hæmorrhage in this Operation, as the Antients were of Opinion. It may be ſufficient only to tie up the larger Veſſels, and to apply a large Quantity of ſcraped Lint, retaining it with a thick and broad Compreſs and a long Bandage: though my quondam Preceptor BIDLOW, who was well verſed in theſe Operations, adviſes to ſprinkle fine Powder of Plaſter of Paris upon the Lint to ſtop the Hæmorrhage. Others adviſed ſtyptic Powders, or taking up the larger Arteries with a Needle and Thread. But GARENGEOT aſſerts, ſowing up the Lips of the recent Wound immediately after the Operation, as he celebrated

brated PETIT propoſes, to be not only the ſafeſt Method of ſtopping the Hæmorrhage, but alſo the moſt expeditious Way of healing the Wound, and preventing a Return of the Cancer, without the Uſe of Lint, Styptics, or other Medicines. But a Cancer, which I extirpated in this Manner, which I let bleed a conſiderable Quantity after the Operation, was indeed ſoon healed: but then it returned ſoon after, and the Patient expired of a Cancer, which broke out ſeveral Times in the old Seat. I therefore think it very neceſſary to be provided not only with Lint, but alſo *Alcohol Vini* and ſtyptic Powder of Bole, *Sang. Dracon. Colophon. & Maſtich.* to be applied with ſcraped Lint and Puff-ball, in ſuch Caſes, where the Hæmorrhage is violent, and eſpecially when the Patient is weak and infirm; proceeding immediately to the Dreſſing without loſing much Blood. The Remainder of the Treatment is to be managed at each Dreſſing, as we before have directed in treating of Wounds in general. I have ſometimes experienced the Benefit of a large thick Compreſs dipt in warm Ale and Butter, to ſuppreſs the Inflammation in the firſt Dreſſing, as HELVETIUS adviſes: though other Caſes have ſucceeded as well, in which all the Compreſſes were applied dry.

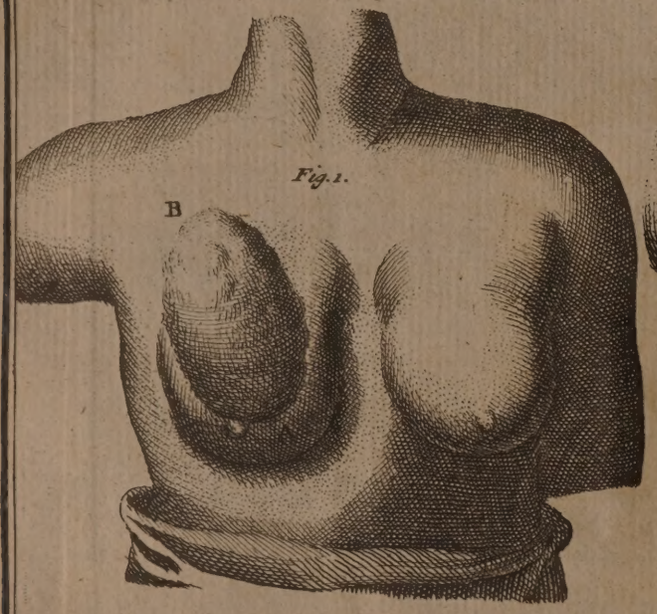
When the whole Breaſt is to be taken off in Cancers.

IV. If the whole Breaſt is become ſcirrhous or cancerous, whether it be latent and intire, or ulcerated, it ought to be extirpated with all the Parts of the Breaſt. And here the Surgeon ſhould conſider before the Operation, as we before adviſed, whether the Cancer has any Communication with the axillary Glands, or whether it adheres to the pectoral Muſcle; in either of which Caſes Authors generally aſſert the Operation to be uſeleſs. But ſome of theſe Cancers have been cured by extirpating thoſe Glands, as we intimated before, at N° II. to which we may add, that BIDLOW aſſerts, he has happily ſucceeded in ſuch Cancers, where Part of the pectoral Muſcle has been alſo affected and extirpated. He alſo affirms the Caſe to be not abſolutely deſperate, even if the Cancer has infected the Ribs with a Caries, which I have alſo experienced myſelf, more than once, having cured ſuch a Caries with the Raſpitory and *Ung. fuſc. Wurtzii.* But if the Cancer has no Communication with the axillary Glands or pectoral Muſcle, there is much more Hopes of ſucceeding in the Cure.

The Manner of operating.

V. When the whole Breaſt is therefore become cancerous, and to be totally extirpated, the principal Ways of performing the Operation are (1) by placing the Patient in a proper Seat; and, according to SCULTETUS, to paſs a large Needle (*Tab.* XVIII. *Fig.* 12.) with a ſtrong Thread or Cord, which is to be drawn through the Bottom of the cancerous Breaſt. The Extremities of the Cord or Ligature are to be afterwards faſtened together, ſo as to elevate the Breaſt: and if one Ligature be not ſufficient, a ſecond may be introduced in a croſs Direction to the former, as in *Tab.* XXII. *Fig.* 4, 5. by which Means the diſordered Parts may be cleanly extirpated, by drawing them, in all Directions, towards the Knife, as well upward, repreſented in *Fig.* 5. as downward, according to SCULTETUS, *Tab.* XXXVI. The Knife uſed in the Operation ſhould be larger or ſmaller, in Proportion to the Breaſt. The 2d Way of performing the Operation, practiſed by SOLINGEN and BIDLOW, differs chiefly from the former in the Uſe of a large Fork (*Fig.* 6.) inſtead of the Ligatures, which is thruſt into the Bottom of the cancerous Breaſt, that by making a ſtrong Elevation, the Knife (*Fig.* 7.) may be paſſed beneath it. But if the Cancer be

Fig. 1.



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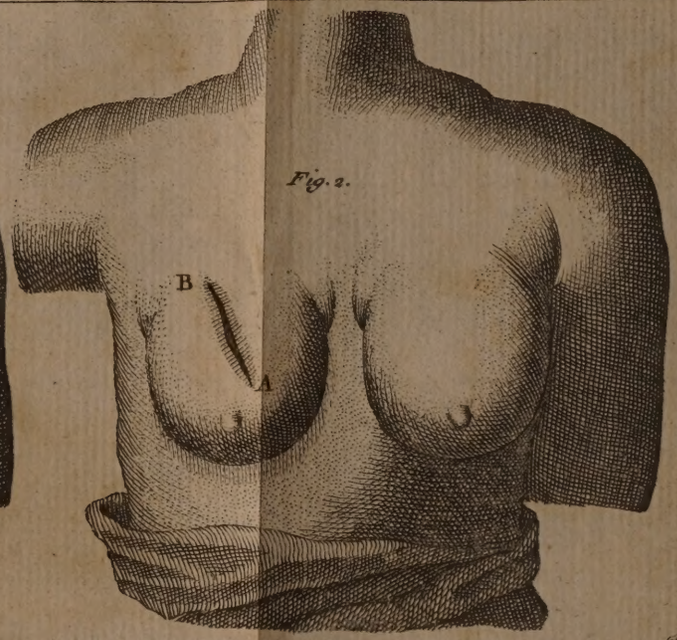

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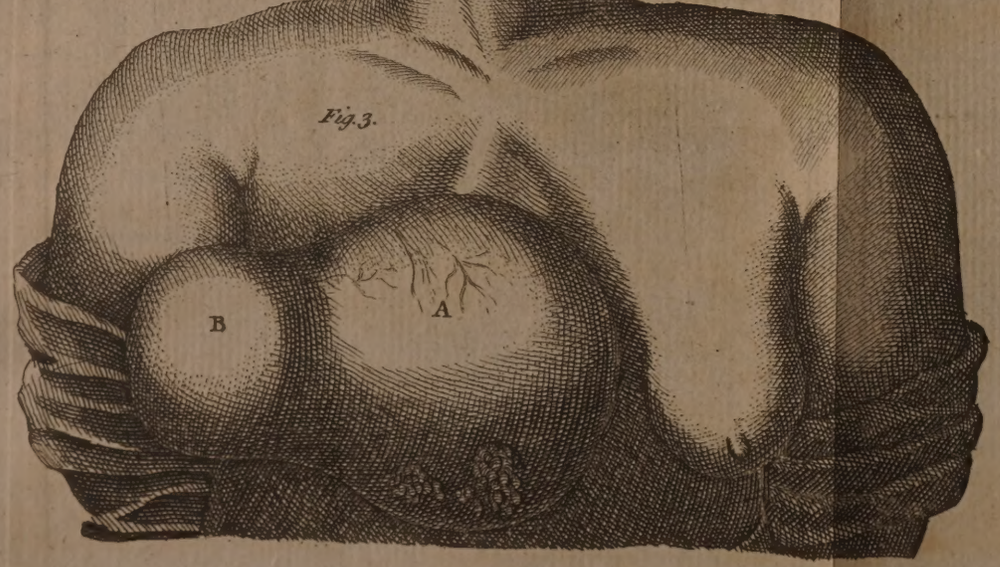


Fig. 4.

Fig. 5.

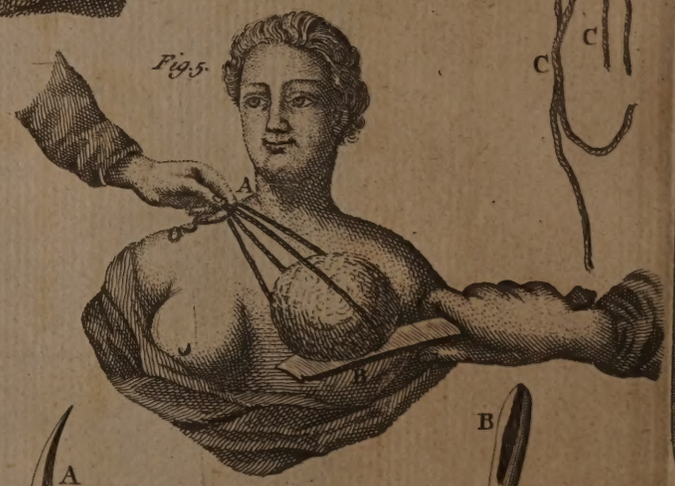


Fig. 9.

Fig. 10.

Fig. 6.

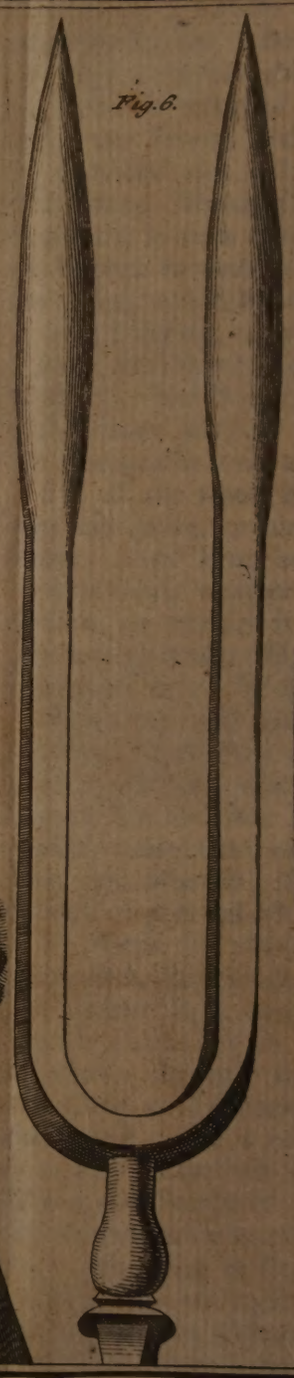


Fig. 7.

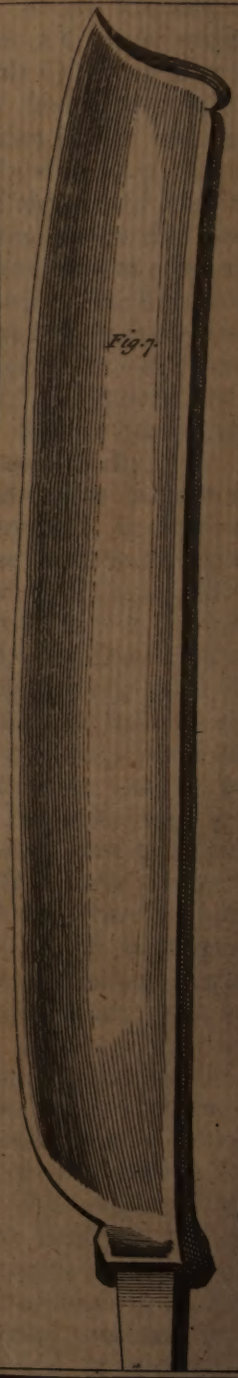
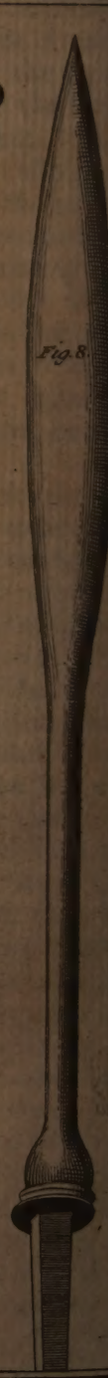


Fig. 8.



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ſmall, BIDLOW uſes a ſingle Inſtrument (*Fig.* 8.) like a ſmall Sword, to perform the Elevation inſtead of the Fork: each of which Inſtruments ſhould be fitted with Handles. But (3) as theſe Methods of operating have been thought too formidable and ſevere by our modern Surgeons, HELVETIUS has endeavoured to effect the ſame, by contriving Pliers inſtead of a Fork: one of which (*Tab.* XXIII. *Fig.* 1.) holds up the diſordered Breaſt by its two Points, AA; the other (*Fig.* 2.) ſqueezes up the whole Breaſt between its Sides, AB; by which Means it may be commodiouſly elevated, and evenly divided by a large Knife. The (4) and laſt, and in my Opinion, the beſt Way of operating, is, when the Surgeon uſes no other Inſtrument but the Knife, whilſt he elevates the diſordered Breaſt with his other Hand: and if the Breaſt ſhould be ſo much inlarged, that the Surgeon cannot contain it in one Hand, an Aſſiſtant may elevate it with both. By this Method I extirpated that large cancerous Breaſt (*Tab.* XXII. *Fig.* 3.) which weighed a dozen Pound, both expeditiouſly and ſucceſsfully. See more Examples in SCULTETUS, *Obſ.* 44.

An EXPLANATION *of the* TWENTY SECOND PLATE.

Fig. 1. AB, exhibits a latent or occult Cancer, occupying but Part of the Breaſt, from the Nipple towards the Shoulder.

Fig. 2. Repreſents the ſimple and rectilinear Cicatrix, left after the Cure of the former.

Fig. 3. AB, denotes a large Cancer, not yet broke, but ſpread through the whole Breaſt. It weighed 12 Pounds, after I had extirpated it with nothing but the Knife and my Hands.

Fig. 4. Shews the Method formerly practiſed to extirpate a Cancer by elevating with large Needles, bb, furniſhed with ſtrong Threads, cc.

Fig. 5. Repreſents the Manner of faſtening the preceding Threads, in the Hand A, to elevate and amputate the Cancer, with the long Knife, B.

Fig. 6. Is a Fork propoſed by SOLINGEN and BIDLOW, to elevate the Breaſt in amputating Cancers.

Fig. 7. Is a large amputating Knife, for this Operation.

Fig. 8. Is the ſingle Fork of BIDLOW, like a Sword, for elevating cancer'd Breaſts.

Fig. 9. Is a large and broad crooked Needle; with a Groove near its Eye, B, to receive the Ligature. The Part B may be faſtened in a Handle, that it may be more eaſily paſſed through the Breaſt.

Fig. 10. Repreſents the Point of the Needle in its true Size, viewed on the internal or concave Surface.

A new Method of extirpating Cancers.

VI. The neweſt Method of performing this Operation, which was contrived a few Years ago by a *Dutch* Surgeon, but made public in a Diſſertation, together with the Inſtrument (*Tab.* XXIII. *Fig.* 3.) by my Friend D. TABOR, a Phyſician, conſiſts in placing the Breaſt between the two Arches of the Inſtrument *Fig.* 3. marked AA BB. Theſe Arches are to be cloſed with the left Hand by the Handles CC. *Fig.* 3. in the Manner repreſented at *Fig.* 4. ſo as to elevate the cancerous Breaſt, which is afterwards to be cut off by a ſharp Knife, in the Form of an Arch marked EF, faſtened by the Screw G, and to

be moved over or acroſs the other Arch DD. But though this is an ingenious Inſtrument, and worthy to be taken Notice of, we cannot help thinking that the ſimple Method of operating before deſcribed at N° V. is much more preferable: yet we were unwilling to omit furniſhing our Readers with this new Method and Inſtrument, which will be explained more at large in the References to *Tab.* XXIII. following.

What is to be done after the Operation.

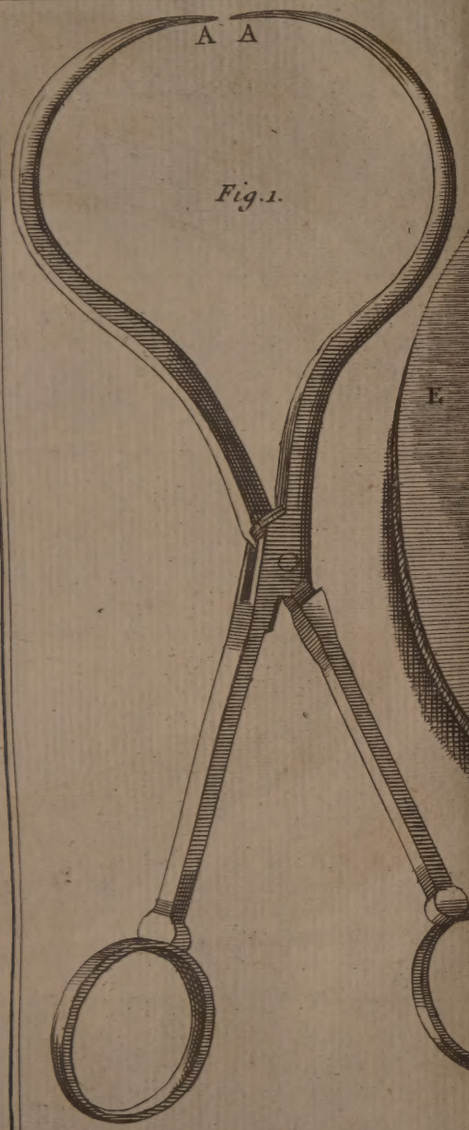
VII. When the Breaſt has been taken off any of the aforementioned Ways, it may be proper to let it bleed a little before it is dreſſed; not ſo much to diſcharge the cancerous and infected Blood, as ſome imagine, as to prevent a future Hæmorrhage and Inflammation. This may however be omitted in caſe of Weakneſs; and then dreſſed as we have directed at N° III. Only we are to obſerve this Admonition, that the Dreſſings are not to be taken off before the third Day: nor even then ſhould any of the Lint be pulled off, till it falls off of its own Accord. And the ſeldomer or more tenderly the Dreſſings are made, the more kindly and ſpeedily does it uſually heal. But when there is a copious Diſcharge, the Dreſſing may be repeated the oftener, and made with dry Lint only, moiſtened with a little Tincture of Myrrh and Amber, inſtead of digeſtive Ointments, which will leſſen the Diſcharge that generally weakens the Patient. [a] In the mean Time, the Patient is to be ſupported not only with good and eaſy Nouriſhment, as Broths, Gellies, Cuſtard, *&c.* but alſo with mild Cordials and pleaſant Emulſions. On the contrary, the Surgeon ſhould be equally ſolicitous to avoid too great Dryneſs, which has been by ſome Authors obſerved as a Mark that the Diſorder will return. In this Caſe it may be therefore proper to apply *Mel Roſarum* to promote a good Digeſtion of the Parts. When the Cancer has been by theſe Means cured, the Patient ſhould ever after obſerve a regular Way of Life, avoiding Exceſſes of all Kinds, and obſerving to bleed and purge at proper Intervals, eſpecially Spring and Fall. If a Fever, with Pain and Anguiſh about the Thorax, attended with a difficult Reſpiration, ſhould ſucceed the Operation; it uſually terminates in Death. To prevent which, the Patient ſhould be bled, and treated as in other Fevers. It ſometimes happens, that the Wound will not heal from a bad State of Blood: in this caſe we muſt palliate only, and treat it with gentle Balſamics, as the Eſſence of Amber or Myrrh; and when the Patients are neceſſitous, with Spirit of Wine only. Some Women ſuſtain the Operation with ſurprizing Courage and Intrepidity of Mind, while others are equally puſillanimous and terrifying with their Clamours; to which the Surgeon ſhould be deaf, according to the Advice of CELSUS, to ſucceed the better in his Operations.

An EXPLANATION *of the* TWENTY THIRD PLATE.

Fig. 1. Is the Pliers or Tenaculum of HELVETUS, ſerving to ſqueeze and hold up the cancerous Breaſt by its two Arches AA, while the Surgeon takes it off by cutting below them.

[a] In this Caſe the Uſe of *Alum. uſt.* with a little *precip. rub.* has been recommended to me as very effectual, in ſpeedily forming a firm Cicatrix.

Fig.



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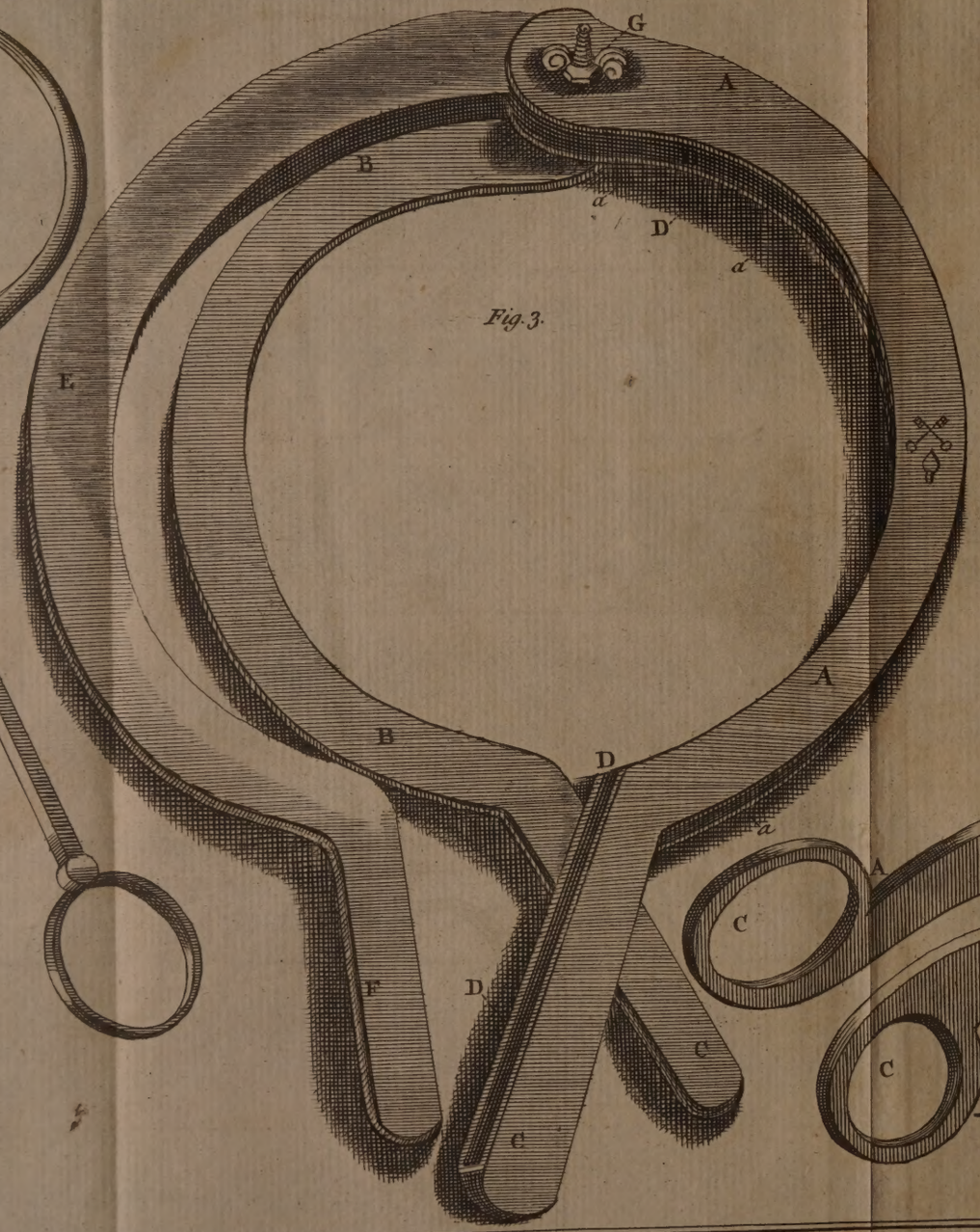

Fig.3.

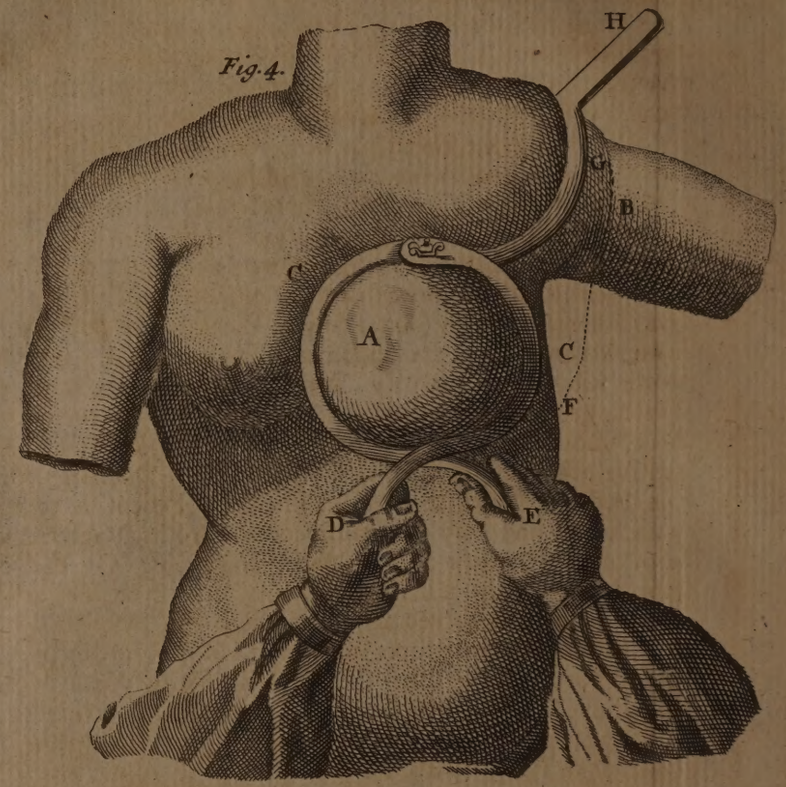

Fig.4.

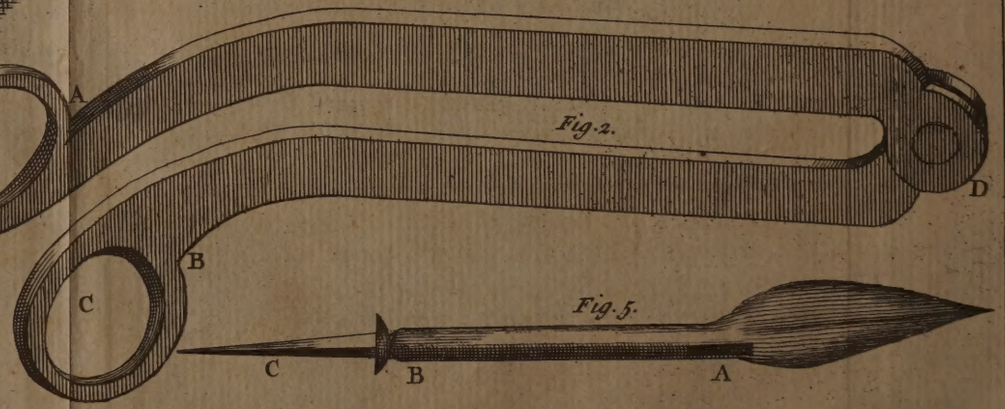

Fig.2.

Fig.5.

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Fig. 2. Exhibits another ſteel Tenaculum, alſo invented by HELVETIUS, for the ſame Purpoſe. AB, its two Sides or Wings, cc, the Rings of its Handles for the Fingers; D, the Hinge by which it is opened and ſhut, to receive and compreſs the Breaſt.

Fig. 3. Repreſents a new Inſtrument for amputating cancered Breaſts. AA, is a ſemi-circular and double Braſs-plate, joined ſo as to leave a Space DDD between, to receive and direct the falciform Knife, EF aaa, the lowermoſt of theſe Plates. BB, is another ſemi-circular and ſingle Braſs-plate to act againſt the former, compreſs, and elevate the Breaſt. G, the Screw by which they are joined to form a compleat Circle to compreſs the Breaſt. CC, the two Handles of the ſemi-circular Plates. F, the Handle of the falciform Knife, which being tranſmitted through the Fiſſure, D, it moves acroſs the Plates, AB, to amputate the Breaſt as in *Fig.* 4.

Fig. 4. Repreſents the left Breaſt of a Woman, cancerous, and going to be amputated. A, the cancerous Breaſt; B, the Arm extended; cc, the two ſemi-circular Plates, by which the Breaſt is compreſſed and elevated; D, the left Hand of the Surgeon holding the two Handles of the ſemi-circular Braſs-plates; E, the right Hand, guiding the Handle of the falciform Knife, which is to be moved in the Direction, FGH, to divide the Breaſt.

Fig. 5. Is a kind of Needle for making the tranſverſe Seton. A, the Eye of the Inſtrument through which the Ligature is to be drawn, and when it has paſſed through the Integuments to B, the Ligature is to be drawn out of the Eye, A, and left in the Wound while the Inſtrument is drawn back again. C, the Part of the Inſtrument which is to be faſtened in a wooden Handle.

CHAP. CVIII.

Of the Paracenteſis or Perforation of the THORAX.

I. BY Paracenteſis Phyſicians underſtand a Perforation of the Thorax, Abdomen, and ſometimes the Scrotum, to diſcharge Water, Blood, Matter, or ſuch other preternatural Subſtances as are there lodged. But the Paracenteſis or Perforation of the Thorax, which we here conſider, is uſually made between the Ribs, in ſeveral Diſorders, and particularly in the Empyema or Diſorder in which a purulent Matter is contained in the Cavity of the Thorax, after an Inflammation and Suppuration of the Lungs and Pleura: which, if it be not timely diſcharged by this Operation, not only obſtructs Reſpiration, but alſo returns into the Blood, by corroding the Lungs, Diaphragm, *&c.* and occaſions a continual Hectic, with a Conſumption of the whole Body, and other bad Symptoms. 2. This Operation may be neceſſary to diſcharge Blood, which has been extravaſated into the Cavity of the Thorax, in Wounds of that Part by whoſe Orifice it cannot be diſcharged, but proves the Cauſe of many Diſorders, which we before declared in *Part* I. *Book* I. *Chap.* X. *N°.* 10. This is by the *French* improperly called the Operation for the Empyema; ſince Matter is neceſſary to conſtitute that Diſorder. It ſhould therefore be called barely in this Caſe the Paracenteſis of the Thorax. The Paracenteſis is alſo neceſſary,

When the Paracenteſis is neceſſary.

3. In a Dropſy of the Breaſt, by which the contained Water, fluctuating in this Cavity, and obſtructing the Patient's Reſpiration by its Weight, may be diſcharged. But before we proceed to the Operation, it ſhould be firſt conſidered whether the Patient's Strength will admit of it, or his Diſorder be thereby relieved: for weak Patients often expire in or ſoon after the Operation. The ſame Event uſually attends this Operation alſo, when the Diſorder is become ſo inveterate, as to diſſolve or ſuppurate the Viſcera, and occaſion a Fever, attended with Looſeneſs, great Difficulty of Breathing, Faintings, or cold Sweats, which are the uſual Forerunners of Death; and import, that this Operation will not be attended with its due Succeſs. Therefore the Surgeon may hereby gain Reflexions, but no Credit. But if the Diſorder be yet recent, and the Patient ſtrong, he may then ſafely venture on the Paracenteſis of the Thorax, which may be perforated without any Danger by a prudent Surgeon, who divides only the Skin, Fat, intercoſtal Muſcles, and Pleura.

What part of the Thorax ſhould be perforated.

II. Two Things are neceſſary to be conſidered before the Operation: (1) in which Side of the Thorax the Matter is contained: and 2^dly, what Part of that Cavity is moſt proper to be perforated. In order to diſcover the firſt, the Surgeon ſhould obſerve diligently, (1) In which Side the Patient has before had any Pain or Inflammation: (2) In what Part he perceives the Weight and Fluctuation of Matter: (3) On which Side he can lie eaſier than on the other, for that is uſually the Side affected; the Perſon not being able to lie on the ſound Side, becauſe of the Weight or Preſſure of the Matter on the Mediaſtinum. (4) And laſtly, he may generally perceive ſome Tumor and inflammatory Heat in the Side affected. Having diſcovered which Side of the Thorax is to be perforated, the Operation may then be ſafely performed between the ſecond and third of the ſpurious Ribs on the left Side [a], or between the third and fourth on the right Side, counting from below upwards, ſo as to be about five or ſix Fingers Breadth from the Spine of the Back, and as much below the Angle of the Scapula. For if the Thorax be perforated higher, the peccant Matter lodged in the Bottom of its Cavity will not be eaſily diſcharged: and if the Operation be made lower, there is Danger of wounding the Diaphragm, eſpecially on the right Side, where it adheres higher up to the falſe Ribs, by reaſon of the ſubjacent Liver. Nor can the Perforation be eaſily and ſafely made near the Spine of the Back; becauſe of the Thickneſs of the Integuments and Muſcles, with the Danger of injuring the intercoſtal or other Veſſels. The Place here aſſigned is therefore the moſt convenient and ſafe for the Paracenteſis.

The Method of performing the Operation.

III. The Surgeon having marked the deſcribed Place with Ink, and taken up the Integuments between his own Fingers and thoſe of an Aſſiſtant, as in cutting Iſſues; he then makes an Inciſion of about three Inches long, according to the Courſe of the Ribs, that he may afterwards more eaſily perforate the intercoſtal Muſcles. The Part thus prepared is then perforated with the Trocar (*Tab.* XXIV. *Fig.* 1.) according to the Practice of ſome Surgeons: which being introduced into the Cavity of the Thorax, its triangular Bodkin (*Fig.* 2.) is extracted, and the Tube only left in the Wound, whereby the Humours are

[a] BOERHAAVE (Aphor. 303.) tells us the Perforation ſhould be made between the ſecond and third of the lower *true* Ribs, which is contrary to the Opinion of all expert Surgeons; but he might poſſibly mean, *falſe* Ribs, which adjuſts the Difference.

drawn

drawn off and diſcharged as long as the Patient's Strength will admit. When the Patient is perceived to be near fainting, or the Matter appears to be totally evacuated, the Cannula of the Trocar may be then ſuddenly removed, and a flexible Tube (*Tab.* II. *Fig.* IX.) of Silver or Lead (*Tab.* II. *Fig.* 5.) inſerted in its Place, which may be faſtened to the Thorax, with a Piece of Plaſter and a Ligature. Over the Mouth of the Tube may be applied a Compreſs, retained by the Bandage called the Napkin and Scapulary. Sometimes the Trocar is introduced through the Integuments and intercoſtal Muſcles by one puſh againſt its triangular Bodkin. But as the Lungs, which frequently adhere to the Pleura, may be by that Means injured, the following Method is always preferred by cautious and prudent Surgeons. Having prepared the Integuments by Inciſion as before, they then cautiouſly divide the intercoſtal Muſcles, and Pleura by a tranſverſe Inciſion with the Scalpel, G or H, *Tab.* I. and having introduced the Cannula as before, the contained Humours of the Thorax are thereby diſcharged. During the Operation the Patient ſhould be retained in an inclined Poſture, by which Means the Ribs will be elevated more from each other, and a larger Space made for the Inciſion. A ſufficient Opening being made into the Thorax, the Finger is then to be introduced, in order to ſeparate the Lungs from its Adheſions to the Pleura, and to make Way for the peccant Humours. Which laſt Method of performing the Paracenteſis is certainly preferable to the former, notwithſtanding it requires more Diligence in the Operator and Reſolution in the Patient. For beſides avoiding the Lungs, which would elſe be probably wounded, they may be ſeparated by the Finger or Probe without Damage, and a larger and more perfect Diſcharge made of the offending Matter. And if we take the Advice of PETIT, we ought totally to abſtain from the Uſe of Tubes or Tents in the Operation, as they are attended with ill Conſequences; only ſtopping up the Orifice of the Wound with a Piece of ſoft Linen-rag convoluted or rolled up, whereby it may be kept open for future Diſcharges. But over the Obſtacle of the Wound, is to be applied ſoft Lint, faſtened to a Thread, and to be retained with Plaſter, Compreſs, and Bandage.

IV. The Dreſſing may be afterwards made once or twice a Day, diſcharging and waſhing out the Matter, by injecting ſome deterging Liquor at each Dreſſing, which may be repeated according to the Patient's Strength. A Decoction for this Purpoſe may be made of vulnerary Herbs, as *Veronica*, *Scabioſa*, *Solidago Saracenica*, with *Mel Roſarum* and Oil of Myrrh; and if the Patient is not troubled with a Cough, a little Tincture of Myrrh, and WURTZ's pectoral Balſam. GARENGEOT frequently recommends a Decoction *ex Perſicaria* and *Althea*, when the Diſorder ariſes from a Pleuriſy or Peripneumony: a Tincture of Sulphur of Antimony, made with Spirit of Wine, is alſo very efficacious in deterging and healing theſe Parts. Others extol a Mixture of *Aq. Calcis* with *Mel Roſarum*. Theſe Injections ſhould be continued till they are obſerved to return clean, and unmixed with bloody or purulent Matter, which is a Sign that the Parts are healed and become ſound; whereupon the Tube or Lint may be withdrawn from the Perforation of the Thorax, and the reſt of the Cure compleated according to our Directions in Wounds of the Thorax. It may be however obſerved, that the Diſcharge of the injected Liquors may be much promoted

Dreſſing after the Operation.

promoted by the Patient bending himſelf towards the Wound, and fetching a deep Inſpiration. And during the whole Cure it may be equally advantageous to join internal Medicines, eſpecially vulnerary Decoctions and Balſams, with a proper Regimen and Diet, in this, as in order Diſorders. See a Hiſtory of this Operation, performed in an Empyema, in SCULTETUS, *Obſ.* 52. and in SAVIARD, *Obſ.* 115.

Ulcers of the Breaſt running under the Integuments.

V. It is to be here obſerved, that the Matter formed after Pleuriſies and other Inflammations of theſe Parts does not always penetrate into the Cavity of the Thorax, but tends ſometimes externally under the Integuments, ſo as to form an Abſceſs or Tumor. In this Caſe, the Surgeon is to open, not the Thorax, but the Tumor itſelf, which is the Seat of the Diſorder, and appears externally, though it may be in Part contained in the Thorax as well as on its Surface. The Matter contained in theſe Abſceſſes is ſometimes ſo acrimonious, as to corrode the Ribs and greatly ſpread the Diſorder: in which Caſe, if the carious Parts of the Ribs cannot be removed, it is almoſt an Impoſſibility to effect a Cure[a].

CHAP. CIX.

Of trepanning the STERNUM.

AS Abſceſſes are ſometimes formed under the Sternum between the Membranes[b] of the Mediaſtinum from a Fall, Blow, Inflammation, or from other Cauſes; there is hardly a Poſſibility of diſcharing the Matter any other Way than by trepanning the Sternum. If the prudent Surgeon or Phyſician is therefore ſatisfied, that ſuch an Abſceſs is formed in this Part, which is often no eaſy Matter to determine, the Operation ſhould then be executed in the following Manner. Firſt, the Patient is to be inclined backward, and a cruciform Inciſion made in the Integuments upon the lower Part of the Sternum, where the Abſceſs ſometimes makes a Point. Then, the Integuments being freed from the Sternum, the Trepan is to be applied in the Manner we have directed, in perforating the Bones of the Cranium: and when an Aperture in the Sternum has been made by this Inſtrument, the Patient ſhould then be inclined forward, and ordered to cough, or fetch a deep Inſpiration, to promote the Diſcharge of the Matter. The Abſceſs may be then deterged and healed with Injections as before, and afterwards treated as in *Chap.* XLI. Some think trepanning the Sternum is an Operation not ſo dangerous as that of the Cranium: becauſe in the latter, the Surgeon is more liable to wound the Brain, or its Meninges. But after all, it muſt be confeſſed that the Signs, by which we conjecture purulent Matter to be contained in this Part, are often uncertain and fallacious, which may occaſion this Operation to be performed when there is no Neceſſity. HOFFMAN, and others tells us, that Humours contained under the Sternum, may be diſcharged by a

[a] Of Fiſtulas in the Thorax. See SCULTETUS, Obſ. 52. and DIONIS's Surgery.

[b] Some deny that there is any Interſtice between the Membranes of the Mediaſtinum; which may however be eaſily demonſtrated: and though the Interſtice is altogether inconſiderable in ſound Bodies, it is often dilated into a very large Cavity by purulent Matter, as BLASIUS obſerves. *Obſ. Anat.* P. 15.

Perforation

Perforation in that Bone without any Danger. DIONIS alſo acquaints us that he has ſeen this Operation performed, but the Patient expired ſoon after. PETIT adviſes trepanning this Bone, when a violent Pain has continued there after a Fracture, notwithſtanding it be ſet and united, for he thinks it a certain Sign of a latent Abſceſs in this Part: and he elſewhere aſſerts, that the contained Matter has ſometimes corroded through the Sternum, diſcharging itſelf by a ſmall Aperture. But as ſuch an Ulcer cannot be ſufficiently freed and cleanſed from its Matter by ſo ſmall an Aperture, it ſhould be therefore inlarged, as we here propoſe, by the Trepan, and afterwards cleanſed and healed as before. *Vide Lib. de Oſſ. Cap. Carie & Exoſteſi.*

CHAP. CX.

Of the crooked or hump-back.

I. GIbboſity is a preternatural Incurvation of the *Spina Dorſi*, either backward or on one Side. Infants are obſerved to be more frequently the Subject of this Diſorder than Adults; which proceeds oftner from external than internal Cauſes, as a great Fall, Blow, or the like; whereby the tender Bones of Infants are diſtorted or deformed. If it proceeds from an internal Cauſe, it is uſually from a Relaxation of the Ligaments which ſuſtain the Spine, or a Caries of its Vertebræ; though the Spine may be inflected forward, and the Back thrown out, by a too ſtrong and repeated Action of the abdominal Muſcles; which if not timely redreſſed, uſually grows up, and fixes as the Bones harden, till in the Adult it becomes totally irretrievable. But when the Diſorder is recent, and in a young Subject, there may be hopes of alleviating by Degrees, if not perfectly curing this Diſorder. Deſcription of this Diſorder.

II. As a healthy Conſtitution depends greatly upon a regular Formation of the Thorax, that Part is uſually aſſiſted in this Diſorder by a Machine made of Steel, Paſteboard, or Wood, which acts chiefly upon the gibbous Part; the Uſe of which ſhould be continued by Infants and Children as they grow up, till the Deformity diſappears. But we have a chirurgical Inſtrument purpoſely contrived for this Diſorder, ſomewhat reſembling a Croſs, as in *Tab.* XXIV. *Fig.* 5. where AA are applied to the Shoulders and Back; BB, to the Neck; CC DD to the Shoulders and Arms; EE, being faſtened by a Ligature to the Waiſt. By which Contrivance the Deformity may be prevented from growing worſe, if it be not totally rectified; eſpecially if the Part affected be frequently bathed with *Aq. Hungar. Spt. Lavend. &c.* and defended with a ſtrengthening Plaſter of *Opodeld. Nerven. Vigonis, Oxycroceum, &c.* at the ſame Time not neglecting the Uſe of proper Internals: all which may be of conſiderable Advantage, when the Diſorder is not become inveterate. Method of Cure.

PART

PART II. SECT. V.

Of Diſorders in the ABDOMEN, *appertaining to Surgery.*

CHAP. CXI.

The Method of tying the Navel-ſtring in new-born Infants.

How to make a Ligature on the *Funiculus Umbilicalis.*

I. IT is a Method univerſally received by all prudent Surgeons and Midwives, to make an exact Ligature upon the umbilical Cord of the new-born Infant; leſt it ſhould bleed to Death, by the Veſſels which compoſe it. This Ligature is to be made, as ſoon as the Infant and After-burthen are delivered, with a ſtrong Thread of about an Ell long, folded together four Times: and having made a Knot at one End, it is to be then paſſed twice round the Navel-ſtring at about two or three Fingers breadth from the Abdomen, and afterwards tied with a double Knot. This done, the Cord leading to the Placenta may be divided with a Pair of Sciſſars below the Ligature, and the wounded Part belonging to the Infant dreſſed with Lint, after which it may be left to the Nurſe, till it becomes dry and falls off of itſelf. I am not ignorant that it is the proper Buſineſs of a Midwife to perform this Office: but notwithſtanding that, both the Surgeon and Phyſician ought to be acquainted with it: For if they ſhould chance to be preſent at an unexpected Labour, and know nothing of this Affair, the Infant may be loſt, by bleeding to Death, to the great Damage of their Reputation.

The Operation judged unneceſſary] by ſome.

II. There are ſome of the Moderns who think tying up the Navel-ſtring to be uſeleſs and unneceſſary[a], telling us of their having ſeen ſome Caſes where it was omitted, without any conſequent Danger; which I believe may ſometimes happen. But there are many Inſtances well known to myſelf, and others, where the Infant has been loſt by bleeding to Death, after dividing or lacerating the umbilical Cord, without tying it up: and therefore ſuch are to be eſteemed Whores, or people of bad Principles, who deſignedly omit the Ligature, and by that Means deſtroy the Infant, which, through the Quantity of Blood this way loſt, ſeldom fails of deceaſing in Convulſions, with other bad Symptoms.

CHAP. CXII.

The Manner of diſcharging the Water contained in the ABDOMEN, *in the Dropſy Aſcites by Paracenteſis.*

How the Operation is to be performed.

I. WE have before mentioned the Paracenteſis of the Thorax. It now remains for us to deſcribe the Manner of perforating or tapping the Abdomen, in order to diſcharge the Water there contained in dropſical Subjects.

[a] V. SCHULTZII Diſſert. *An Funiculi umbilicalis Ligatura, in nuper natis abſolute neceſſaria ſit. Halæ*, 4to 1733. Where the Queſtion is reſolved in the Negative.

But

But is to be obſerved that Experience aſſures us the Operation will be uſeleſs in the Dropſy Tympanites, though its Succeſs is confirmed in the Aſcites, by many having been recovered from that Diſorder by an accidental Paracenteſis or Wound, by which the Water has diſcharged itſelf, and the Patient reſtored beyond Expectation. Inſtances of this we have given us by ROSSETUS [a]. It is therefore with Reaſon that this Operation is encouraged in Dropſies [b] by the ſkilful Phyſician and Surgeon. Though we muſt confeſs without Diſſimulation that it gives but a temporary Relief to the Diſorder, and that the Patient ſeldom eſcapes Death after it, not ſo much from the Operation as the Conſumption and bad Habit of his Juices, with the infirm State of his Viſcera. Yet we often find that in young and athletic or robuſt Patients, who have not been long ſubject to the Diſorder, the Operation may be uſed with Succeſs, and the Patient perfectly recovered. If no Benefit is therefore found from a proper Diet and Courſe of Phyſic, it will be neceſſary to proceed to the Operation without Delay, before the Strength of the Patient is too much exhauſted, or his Viſcera affected or vitiated by the morbid Lymph. But, on the contrary, when the Dropſy proceeds from a Scirrhoſity of ſome of the Viſcera, and is attended with an internal Abſceſs and a Conſumption of the whole Habit, the Surgeon can expect no Credit or Succeſs from undertaking the Operation: neither can he expect it in thoſe Dropſies which come upon the Patient, not by Degrees, but all at once, which is a Sign of ſome large lymphatic Veſſels being burſt. But for the Operation itſelf, it is neither dangerous nor very troubleſome to the Patient, as the inflicted Wound is but ſmall, and made in a fleſhy Part.

The Method of diſcovering Water in the Abdomen.

II. That the Surgeon may be firſt well aſſured there is a Quantity of Water in the Abdomen, before he undertakes the Operation, he is to apply his two Hands on each Side the Patient's Belly, as he ſtands or ſits, and to ſhake it from one Side to the other; by which Means he will perceive a Fluctuation of the Water from one Side to the other: which cannot be obſerved when the Lymph is not extravaſated into the Cavity of the Abdomen. In the laſt Caſe the Operation is uſeleſs.

First Method of performing the Operation.

III. There are ſeveral different Methods uſed for performing the Paracenteſis of the Abdomen, which we ſhall explain in order. The firſt and neweſt is by laying the Patient on the Side of his Bed, and inſerting the Trocar (*Tab.* XXIV. *Fig.* 1.) into the Cavity of the Abdomen, at or about the Diſtance of eight Fingers breadth from the Navel, or in the Middle of the Space between the Navel and Angle of the *Os Ilium:* and after drawing out the ſharp-pointed Bodkin *Fig.* 2. from the Cannula *Fig.* 3. which is left in the Wound, ſo much of the Water may be drawn off at a Time as the Patient can well bear. And if the Patient does not grow faint, the whole Quantity may be drawn off at once. In order to keep them from fainting, it is uſual for the two Hands of the Surgeon or an Aſſiſtant to preſs on each Side of the Abdomen during the Operation: or the Swath made of broad Linen perforated in the Middle, as at *Fig.* 8. *Tab.* V. may be put round the Abdomen, and gradually drawn tighter, as we have directed in longitudinal Wounds of the Abdomen, till all the Water is evacuated. After this may be applied a flannel Compreſs to the Abdomen, which has been expreſſed

[a] *De Partu Cæſarea*, Sect. III. Cap. III. pag. 44.

[b] The Operation is therefore of Service only in the Aſcites, never in the Anaſarca, becauſe in the laſt the Tumor is in the cellular Membrane.

out

out of *Sp. Vin.* to be retained by a tight Roller: by which Means, as I have frequently obſerved, the Patient not only avoids fainting, but rather becomes more eaſy and robuſt, ſo as to walk about after the Operation. But on the contrary, as HIPPOCRATES obſerves, if the Abdomen is not compreſſed, when there has been a large Diſcharge of Water all evacuated at the firſt opening, the Patient always faints, and often dies, either in or ſoon after the Operation. It is therefore the Advice of many Phyſicians to diſcharge but a few Pounds of Water at a Time according to the Strength of the Patient: after which the Cannula may be extracted, and as the Wound is but ſmall, almoſt cloſing of itſelf, it may be dreſſed only with a Couple of ſquare Compreſſes, Plaſter, and Bandage; repeating the Operation the next Day, in the other Side of the Abdomen, if the Patient's Abilities permit, and ſo on the third Day, about two Fingers breadth above the laſt Perforation. Freſh Wounds are made rather than to keep open the firſt, to prevent them from mortifying, to which they are very ſubject in hydropical Subjects. In the mean Time, the Patient ſhould be aſſiſted by a proper Diet, Regimen, and Courſe of Phyſic, till he either recovers, or by relapſing requires the Operation to be repeated. For, as CELSUS obſerves, the Diſcharge of the Water does not perform the Cure, but prepares the Way for the Application of Medicines, *L.* 3. *C.* 26. With regard to the Situation of the Patient in this Operation, he uſed formerly to be ſeated on a Chair or Bed. But many of our modern Surgeons after PETIT rather approve of laying him on one Side of the Bed: by which Means the Trocar may be more commodiouſly inſerted into the lower and lateral Part of the Abdomen, the Water more perfectly diſcharged, and the Patient rendered not ſo ſubject to faint as in the perpendicular Poſture. It is alſo the Advice and Practice of many modern Surgeons, to draw off the whole Quantity of Water at the firſt Tapping[a], and to repeat it upon a Return of the Diſorder: but in weak Patients I ſhould rather approve of the former, as the ſafeſt Method. For the Inſtrument uſed in the Operation, that is moſt approved of by PETIT, whoſe Cannula has a long Slit in it, as at *Tab.* XXIV. *Fig.* 4. AA, by which he thinks the Water may be more conveniently diſcharged than by the other. And laſtly, that the Inſtrument may meet with a more eaſy Paſſage in thruſting it into the Abdomen, the End of it may be firſt dipt in Oil.

The 2d and 3d Way of making the Paracenteſis.

IV. It was a Practice among the Ancients to inſert a Knife, whoſe Point was about a third Part of an Inch broad into one Side of the Abdomen, about four Fingers breadth below the Navel, having uſually perforated the Skin firſt with a Cauſtic. Then having introduced a Cannula of Lead, Copper, or Silver, they diſcharged ſo much of the Water at a Time as the Patient's Strength would permit. The Cannula for this Purpoſe was about the Length of two or three Fingers breadth (*Tab.* II. *Fig.* QS) being either crooked in its external Part, or furniſhed with a Rim, to prevent it from paſſing quite into the Abdomen: and when a ſufficient Quantity of Water had been diſcharged by it, the Cannula was left in the Wound, and its Orifice ſtopped with a Cork or Doſſil of Lint, over which was appplied a ſticking Plaſter, Compreſs, and Bandage, with the

[a] The Succeſs of this Practice is inſtanced in *Act. Medic. Berolin. Tom.* IX. *Art.* v.—*Act. Acad. Reg. Paris* 1703. *Journal des Sçavans, ann.* 1722. *Menſ. Julio.* DIONIS and GARENGEOT alſo aſſert, that extracting all the Water at the firſt Time weakens the Patient little or nothing, if a proper Preſſure and Bandage be uſed.

Napkin and Scapulary. The next Day they repeated the Diſcharge again. But there is no doubt that the modern Practice is much more preferable; becauſe by leaving the Cannula in the Wound it is almoſt impoſſible to avoid Inflammation, Mortification, or other bad Symptoms. To avoid theſe Inconveniences, BARBETT contrived a hollow Sort of Lancet or Silver Cannula, which had a Foramen on each Side, that it might ſerve as well to diſcharge the Water as perforate the Abdomen: but as the Inteſtines were in Danger of being injured, by the ſharp Point of this Inſtrument, when the Water was near diſcharged, the Moderns more judiciouſly contrived and uſed the preſent Inſtrument, with the Cannula and ſharp point Needle or Bodkin called a *Trocar*.

Some uſual Obſervations.

V. Though the Trocar is a ſharp-pointed Inſtrument, yet there is no Danger of wounding the Inteſtines by it, when thruſt into the Abdomen; becauſe they are kept at a conſiderable Diſtance from the Inſtrument by the intervening Water. But was the Inſtrument to touch the Inteſtines, they would receive no great Injury, as they make but little Reſiſtance. If the Cannula ſhould be obſtructed with any thing, the Obſtacle may be removed by a Probe, and a free Paſſage thereby made for the Water. Sometimes the *Navel* and Parts adjacent are ſurprizingly diſtended in hydropical Subjects, in the Manner obſerved by HILDANUS, *Obſ.* 47. *Cent.* 1. *& Purmannas Chirurgia Curioſa*, p. 330. in which Caſe it is propoſed by ſome Surgeons to perforate the Navel; to which they are encouraged by reading of a Patient cured by a ſpontaneous Rupture of this Part, though it generally proves very troubleſome; for, beſides the Difficulty of diſcharging the Humours, the Wound made in this Part hardly ever heals. I cannot omit mentioning in this Place a remarkable Caſe, which I remember ſometime ago in a dropſical Woman at *Noremberg*. In whom, after I had tapped the left Side of the Abdomen in the Preſence of ſeveral Phyſicians, who had alſo adviſed the Operation, a large Quantity of Water was diſcharged to the great Eaſement of the Patient: but upon perforating the right Side on the next Day, no Water could be diſcharged. I therefore, with the Conſent of the Phyſicians, again perforated the left Side, upon which we had another copious Diſcharge of Water: but the next Evening, notwithſtanding the Abdomen was well ſecured with a Bandage, the Patient was ſeized with a violent Vomiting, without any manifeſt Cauſe; by which ſhe was ſo much weakened, that it was judged uſeleſs to make any more Diſcharge of the Water. She expired a few Weeks after: but I was not permitted to ſearch for the Cauſe of this uncommon Appearance in the deceaſed.

Other Uſes of the Paracenteſis in the Abdomen.

VI. Though tapping of dropſical Patients does not frequently cure them of the Diſorder, it at leaſt eaſes them of the Oppreſſion, Difficulty of Breathing, and other Symptoms, with which they are afflicted, inſomuch that they cannot ſleep, but are obliged to ſit up both Day and Night, which renders this Operation abſolutely neceſſary. Inſtances of this Operation being performed with Succeſs, may be read in VOELTERI *Schola Obſtetricia*, pag. 63. PECHLINI Obſ. 62. NUCKEI *adenograph.* p. 122. BRUNNER in *Ephem. Nat. Cur. Dec.* 2. *An.* VIII. SINIBALDI *Methodo parva*; SAVIARDI *Obſ.* 119. *Hiſt. Acad. Reg. Pariſ. An.* 1703. *Ubi multa à Verneo referuntur*; DIONIS *Chirurgia*; HELVETII *lib. de Sanguinis Profluviis*, p. 79. *Act. Med. Berolinenſ.* Vol. IX. and X. not to mention the ſeveral Places before quoted in this Chapter.

CHAP. CXIII.

Of the Cæsarean Section or Birth, being the Method of cutting the Fœtus out of the Womb.

The Nature and Kinds of this Operation.

I. THE Cæsarean Section or Birth is a chirurgical Operation, by which the Fœtus is by a careful Section delivered from the Womb of its Mother, when it cannot be delivered in the natural Way. And this is performed either when the Fœtus and the Mother are both alive, or when one of them is already dead; to snatch one at least, if not both, from the very Jaws of Death. It is by the Greeks called *Hysterotomia.* There are many of the most eminent Physicians and Surgeons, who condemn this Operation as barbarous and mortal, such as PAREY, GUILLEMEAU, ROLFINC, HORN, MAURICEAU, SOLINGEN, and others. But upon perusing the Writings of these Authors, I do not find they promiscuously condemn both Kinds of this Operation, but only the more dangerous one of cutting out the Child whilst its Mother is Living; which is certainly a fatal Operation. This they make appear by many Instances of the Operation being unhappily performed. There are chiefly three different Cases, in which this Operation is practicable; the first is, *when the Mother is dead*, either in the Birth, or by some Accident, *while the Fœtus* is perceived, or reasonably supposed to be yet *surviving* in the Womb. The second is, *when the Mother is living and the Fœtus dead*, but incapable of being expelled or extracted by the natural Passages, by any Assistance, either of the Midwife or Surgeon. The third and last Case is, *when the Mother and Fœtus are yet living*, but the latter is incapable of being brought into the World by the natural Passages: by which Means both of them are in the greatest Danger, if not relieved by this Operation. And though some deny that the Fœtus can survive the Death of its Mother, and assert that both decease together [a]; yet I have evidently proved the contrary, by many Instances, in a Treatise, intituled, *Fœtum ex utero matris mortuæ mature exscindendum esse:* To which may be added, the Authorities below [b], and many others.

First in the dead Mother.

II. In the first Case, when the Mother is deceased, and the Fœtus reasonably supposed alive, there are few or no expert Surgeons, who disapprove of the Operation, without which the Fœtus would necessarily die, together with the Mother: and as Delay in this Case is dangerous, they universally agree, that the Operation should be performed, not only as soon as possible, but even before the

[a] As Casp. BAUKIN in Lib. Anat. *Roderic à Castro de morb. mulier.* Lib. IV. Cap. 3. and among the Moderns the celebrated Monsr. MERY in particular, *in Act. Acad. Reg. Scient. An.* 1708.

[b] The Fœtus has been observed to move in the Mother's Belly the Day after her Decease by DOLEUS, *Encyclop. Chir. Lib.* IV. *Cap.* 5. *ult.* To which may be added TH. CORNELIUS, *Progymnasm.* 5. *de Generatione*, p. 207. VESLINGIUS's *Obs. & Epist.* 7. p. 48. TIMÆUS *a Guldenkle, Op. Med. p. m.* 1082. GEO. FRANCUS, *in Satyr. Mid.* IV. SCHELHAMMERUS *in Misc. Nat. Cur. Dec.* II. *Ann.* 5. *Obs.* 14. MAURICEAU's *Obs.* 315. & 593. ROONHUYS *de Morb. Mulier.* ALBINUS's *Diss. de Partu difficili.* VIARDEL *traite des Accouchemens.* VATERUS *in Diss. de Partu Cæsareo ut & de Partu Hominis post mortem Matris.* LA MOTTE, *Lib.* IV. *Cap.* 6. and *Cap.* 13. BRENDELIUS *in Obs. Anat.* VIII. *Dec.* II. SCHACHERUS *in Program. Lipsiæ*, 1731, *edito de Fœtu ex utero Mortuæ exscindendo, aliique.*

Circulation

Circulation in the Mother is ſtopped, becauſe the Fœtus cannot long ſurvive. And in this Caſe we have many Inſtances of the Operation being performed, as well among the Ancients as Moderns: for example, [a] Lyca, Æsculapius [b], Scipio Africanus, thence called Cæsar, and Manlius [c], an Officer at *Carthage*, and as ſome ſay the Emperor Julius Cæsar. Among the Moderns we may reckon Edward the Sixth, King of *England*, and Sanctus, King of *Navar*, and ſeveral others, which are taken Notice of by Authors, and called Cæsars, from the Operation [d]. When the Surgeon therefore perceives the Mother to be in the Agonies of Death, he ſhould be getting every thing ready for the Operation, that when ſhe is deceaſed, he may have nothing more to do than open the Abdomen [e] by a cruciform Inciſion, as in common Diſſections: or if he would proceed more cautiouſly, by making a longitudinal Inciſion on one Side with a Razor or Scalpel, without Reſpect to the Courſe of the Fibres in the Muſcles or Veſſels. And if the Fœtus ſhould have fallen into the Cavity of the Abdomen [f] from a Rupture of the Uterus, or other Cauſe, it ſhould be then taken out immediately: and as it is uſually very weak, a little Wine, Hungary-water, or the like, ſhould be held for it to ſmell at, or a little of the firſt given it to drink endeavouring to recover it by blowing into its Mouth and Noſe, baptizing it immediately in cold Water, and tying up the Navel-ſtring as we have before directed. But if it remains concealed in the Womb, it ſhould then be cautiouſly opened, and the Fœtus extracted, the Navel-ſtring tied and divided, and the Child recovered as before, which compleats the Operation. If the Fœtus ſhould be concealed in the Ovary, or the Fallopian Tube, which is ſometimes the Caſe, it ſhould be alſo thence cautiouſly extracted. But the Surgeon ſhould carefully diſtinguiſh whether the Mother be dead or only in a Deliquium, leaſt he perform the Operation raſhly, as we are told happened to Vesalius. He ſhould be rather well ſatisfied that the Mother is dead, from obſerving whether there be any Motion of the Heart, Arteries, and Lungs, and have the Conſent of the By-ſtanders, in his Opinion, before he enters the Knife: though I know not of any Inſtances of the Operation being performed when the Subject has been miſtakenly ſuppoſed dead, but really alive. And

[a] *Vid.* Virgil Æn. X. Inde *Lycam* ferit, exemptum jam matre perempta.

[b] *Vid.* Ovid. Metamorph. *L.* II.

[c] *Vid.* Plin. Nat. Hiſt. *L.* VII. *C.* IX.

[d] Purmannus *(in Chirurg. Curioſ.* Part II. Cap. 10.) took out a Male Fœtus alive from the Womb of its dead Mother by this Operation, which it afterwards ſurvived. The like Caſe may be read in *Ephem. Nat. Cur. Cent.* III. *Obſ.* 57. *p.* 136. Carol. Stephanus, *Lib.* III. *Cap.* 1. *Horat.* Augenius, *Lib.* IV. *Epiſt.* 2. Jo. Schenckius, *Obſ. Lib.* IV. Guillemeau, *Lib. de Art. Obſ. loc. cit.* Voelterus, *Lib. de Art. Obſ. Lib.* II. *Cap.* 13. Mauriceau, *Obſ.* 26, 251, 315, 353, 374, & 593. and Jo. Valent *Andrea Selenia Auguſtalia, p.* 361. relates the taking out two Male Twins alive, from the Uterus of their Mother, who had been ſhot dead, *&c.*

[e] Some (as Guillemeau and Carol. Stephan) adviſe to keep open the Vagina by the Finger, and the *Os Uteri Interni* with a Stick till the Mother is deceaſed, that the Fœtus may have Air to breath: but as the Fœtus has no Reſpiration in the Womb, that Caution is both uſeleſs and unneceſſary.

[f] Which has been obſerved by Straussius, Baylius, Saviard, Courtial, Bianchus, Calvus, Anelus, *Lib. de fiſt. loc. Part* II. *Pag.* 294. Our Compend. of Anatomy, *Note* 35. *Miſcel. Nat. Cur. Dec.* II. *Ann.* 5. *Obſ.* 63. *Hiſt. Acad. Reg. Sc. Ann.* 1716. *Act. Acad. Nat. Cur. Vol* I. *Obſ.* 176. *Pag.* 397. Pistor, *de Fœtu & rupto utero Abdomen prorumpente, aliique quamplurimi.*

even if the Case should be so, the Surgeon ought not to be much terrified thereat: because he is not committing Murder, but does it with a good Intent to preserve the Fœtus; to which he is obliged, as well by religious as national Laws. And in such a Case he may stitch up the Wounds again, and treat them according to our Directions in the first Part, and that possibly to good Effect, especially if the Opening was made barely by a longitudinal Incision on one Side. For if the Surgeon should delay too long through Timidity, the Fœtus may be lost, and his Operation performed in vain. Others condemn the Operation, because we are not certain the Fœtus is yet living, in which Case they never fail to be treated with Reflexions from the common People: but in my Opinion, admitting this to be true, it is better to open ten, nay, a hundred dead Women in vain, than to lose the Life of one Fœtus for want of the Operation.

That all Women dying before Delivery should undergo the Operation.

III. My general Advice is, that the Operation be performed as soon as possible upon all Women dying before, or in Delivery: partly, that the Fœtus may be taken out alive, baptized, and preserved from the Jaws of Death to Posterity; partly for the better Information of Physicians, Surgeons, and Midwives, to acquaint them with the Disposition, Structure, Situation, *&c.* of the Womb, in a gravid State, with that of the Fœtus and After-burthen, that they may the better assist others in the like Cases; and partly, as DEVENTER observes, to detect the Cause, whether the Midwife or Surgeon has, by their Ignorance and Mis-conduct, occasioned the Misfortune, that they may be better informed or duly punished. Much more might be said in Vindication of this Practice, to shew that it is agreeable with the [a] Roman Laws and Principles of Christianity; but more may be seen upon this Subject, in *Dissertatione Juridica de Jure Embryonum, Jenæ, Ann.* 1716. also NYMANNUS and WINCLERUS, *de vita Fœtus in utero*, GUILLEMEAU, PAREY, HILDANUS, MAURICEAU, DEVENTER, LA MOTTE, and MELLIUS on the Art of Midwifry.

The second Case, when the Fœtus is dead and the Mother alive.

IV. The second Case, in which this Operation may be necessary, is, *when the Mother is living and the Fœtus dead*, without any Possibility of extracting it by the natural Passages: As when the Fœtus appears to be contained in the Fallopian Tube, Ovary, or Cavity of the Abdomen [b], of which we have various Instances in Authors; or when it is lodged in a kind of Hernia or Sacculus without the Abdomen, as SENNERTUS [c] and HILDANUS [d] have described: or if it be obstructed by a callous, scirrhous, or other Tumor, in the Vagina or *Os Tincæ*, which may render the Extraction of it impracticable; or when the natural Passages are not large enough, either from an irremediable Coalition, or Callosity of the Vagina [e]; or from a bad Conformation of the Os Pubis, as

[a] *Vid. Digest. Lib.* II. *tit.* 8.

[b] The Signs thereof are no Relaxation of the *Os Uteri*, nor discharge of the Waters after the Labour Pains have been felt, the Fœtus appears higher up in the Abdomen, and its Head, Arms, Legs, *&c.* may be more perfectly distinguished by feeling than usual. *Vide Welschii notam in Cap de Sect. Cæsarea.* SCIPIO's *Mercur.* PISTOR's *Dissert. de Fœtu rupto utero in Abdomen prodeunte. Diar. Erud. Paris.* 1722. *Mens. Junio.* SAVIARD's *Chirurg. Obs.* 60. DIONIS's *Dissert. de Generatione.* Our Compend. of Anatomy, *Note* 35.

[c] *Instit. Med. Lib.* II. *Part* I. *Cap.* 9.

[d] *Epist. de Hernia Uterina.*

[e] *Act. Erud. Lipsi. Ann.* 1693. *P.* 229. VATERUS *de Partu Cæsareo, Vitebergæ, Ann.* 1695. where some-

sometimes happens in crooked Women, by which Obstacles the Fœtus is rendered incapable of being delivered, while the Mother is spent and in danger of Death, by the violent Pains, Convulsions, Hæmorrhage, *&c.* In all which Cases I think the Operation is necessary to preserve the Mother and Fœtus, notwithstanding it has been condemned by many of the ancient as well as the modern Surgeons and Physicians. For in such Cases the Extraction or Excision of the Infant, so as to bring it through the natural Passages, which MAURICEAU prefers to the Cæsarean Section, cannot be performed. There is therefore but one Remedy left to preserve the Life of the Mother and Fœtus when she cannot be delivered: and that is the Cæsarean Section, or cutting the Fœtus out of the Abdomen or Uterus; the Success of which Practice is confirmed by various Instances. MAURICEAU therefore speaks contrary to Reason and Experience, when he pronounces this Operation always fatal to the Mother.

The Operation rejected by some in particular Cases.

V. We are encouraged to the Operation by many, when the Mother is supposed to be deceased, and even when the Mother is alive, when Nature seems to point out for the Operation, by some painful Tumor or Abscess formed at the Navel, or in some other Part of the Abdomen: in which Case the Operation has succeeded by relation in many Instances; because the Hæmorrhage in that Case is usually small, and the Fœtus generally found in the Fallopian Tube, Ovary, or in the open Cavity of the Abdomen itself. But when the Fœtus is contained in the Womb of its Mother yet living, without any Appearance of an Abscess, in that Case the Operation is condemned by many eminent Physicians and Surgeons, as both cruel and fatal: but that they entertain such an erroneous Opinion contrary to Reason and Experience, is made evident by many of their own Profession as below [a].

The Difficulty and Necessity of performing the Operation considered.

VI. It must indeed be confessed, that the Operation is both hazardous and dangerous to the Mother, especially when there is no Abscess formed, but the Fœtus must be cut of the Womb: and therefore it should never be undertaken but in Cases of the last Necessity. But that the Operation may sometimes be performed with Success, may be concluded both from the forequoted Authorities and those which follow. GOVEUS, ROSSETUS, MERCURIUS, WELSHIUS, and others, assert the Operation to be not only practicable with Success, in a skilful Hand, but also alledge many Instances of those who have recovered after the Operation, which they think to be no more dangerous than cutting for the Stone. But I cannot be of their Opinion, since there are many fatal Accounts of it given us by Writers; and especially as there is great Danger of losing the Patient from the great Hæmorrhage, or a Mortification following the Wound

he describes the Vagina to have been altogether callous, from a preceding Ulcer, and not large enough to admit a Pea. *V.* SAVIARD *Obs.* 114. MAURICEAU *Obs.* 26.

[a] The Operation is encouraged by ROSSETUS, BAUHINUS *Lib. de Partu Cæsareo.* SENNERTUS *in instit. Medic. & praxi Medica.* HILDANUS *Epist. de Hernia Uterina, in oper. Pag.* 897. FIENUS *in libris Chirurg. Cap.* VIII. SCULTETUS *Armam. Chirurg. Tab. de Partu Cæsareo.* SCIPIO MERCURIUS *Lib. de Arte Obstetricandi. Cap. de Partu Cæsareo.* RONHUSIUS *Lib.* II. *Obs. Chirurg.* 1. *de morb Mulier.* RULOVIUS *Lib. de Sect. Cæsar.* RANCKISCHIUS *Vib. Act. Erud. Lipsi. Ann.* 1693. *Pag.* 229. *& Misc. Nat. Cur. Dec.* III. *Ann.* 2. *Obs.* 17. *itemque.* VATERI *Diss. de Partu Cæsareo.* SAVIARDUS *Obs. Chirurg. Obs.* 69. JOBERTUS *Diar. Erud. Paris. Ann.* 1692, and 1693. LA MOTTE *de Art. Obstetric. Lib.* IV. *Cap.* 12. TEICHMEIRUS *in Instit. med. Forensis, Pag.* 18. and others, who assert the Operation to have been performed with Success, the Mother happily surviving.

in the Uterus; as Celsus obſerves, *Lib. 3. C. 56.* Therefore Mauriceau, and others, juſtly adviſe rather to extract the Fœtus by Inſtruments through the natural Paſſages, if poſſible, rather than to execute this dangerous Operation. But when that is impracticable, as it frequently may be, from the Cauſes before mentioned, ſo that both Mother and Fœtus are in the utmoſt Danger, it would even be barbarous to neglect an Operation, which may poſſibly be the Means of ſaving them both, which muſt otherwiſe inevitably periſh: for in ſuch a Caſe it is better to try an uncertain Means than none at all, as Hippocrates and Celsus adviſe, rather than leave the Patient deſtitute to the Extremities of Torture and certain Death, when there is a Poſſibility of Relief from the Operation, to which we are encouraged by many Inſtances of its Succeſs. Others think it better to leave the Event to Nature, when the Delivery is impracticable, than to expoſe the Patient to ſo hazardous and ſevere an Operation: for, ſay they, Nature often makes Way of herſelf, whereby the Fœtus may be diſcharged by an Abſceſs in the Abdomen at the Navel, Inguen, or Rectum. To this I readily aſſent, when the Patient is in no Danger of Death, by ſuch Expectation: but when the Patient's Life may be in the utmoſt Danger by waiting for ſuch an Event, I think the Operation ſhould be entered on without Delay, eſpecially when the Mother being deſirous of Life, not only gives her Conſent, but even anxiouſly ſollicits it. And of this there have been many Inſtances. See Saviard *Obſ.* 60. and Hildanus, in his Letter *de Herniâ Uterinâ*. Others again are afraid of performing the Operation, leſt it ſhould injure their Character. An excuſe intolerable, even in a moral, and much more a Chriſtian Perſon, to be the Cauſe of the Death of two at once by their Neglect! So that we think with La Motte, when the Delivery is impracticable, that the Surgeon cannot acquit himſelf with a ſafe Conſcience to his Patient, without trying the Operation as the laſt poſſible Means of Relief.

Apparatus neceſſary for the Operation.

VII. If the unhappy Patient therefore ſubmits to the Operation, the Surgeon ſhould well conſider, whether ſhe has Strength ſufficient to go through it: for if ſhe is quite faint and worn out with Agonies, if the Extremities are cold, and a cold Sweat is come on, there is great Danger of her expiring, either under or ſoon after the Operation. In this Caſe her Death may be unjuſtly imputed to the Surgeon by malevolent or ignorant People. But if ſhe has Strength ſufficient, and there are Hopes of ſaving one or both of them, he ſhould by all Means attempt it. To perform the Operation, He ſhould firſt have in Readineſs his Apparatus of Inſtruments and Dreſſing; ſuch as the ſtraight Inciſion Knife (*Tab.* XXX. *Fig.* 8.) or an Inciſion Knife, like thoſe uſed in common Diſſections, with another that is obtuſe pointed, repreſented in *Tab.* V, with Sciſſars alſo, obtuſe pointed, crooked Needles, and ſtrong Thread, as we directed in *Gaſtroraphia*, or ſtitching up of Wounds in the Abdomen, together with two or three Sponges, and ſome warm Wine in a Veſſel; not omitting the Dreſſing, conſiſting of ſcraped Lint, Plaſter, Compreſs, and Bandage, ſuitable to the Operation, with Reſtoratives for the Patient in caſe of fainting, Volatiles for the Noſe, and ſome Cordial to be given internally. All theſe being provided and rightly diſpoſed, the Patient's Bladder ſhould be emptied, leaſt by Diſtention it ſhould be injured by the Knife, and the Patient then placed in the Middle of the Chamber upon the Bed, in ſuch a Manner, that the Operator and his Aſſiſtants

may each perform their proper Office. The Patient ſhould then be encouraged with comfortable and enlivening Diſcourſe, and her Face covered from ſeeing the Inſtruments which might ſtrike a Terror. And laſtly, four ſtrong Perſons, at leaſt, are to be placed to hold the Arms and Legs, that the Patient may not move under the Operation.

Method of performing the Operation.

VIII. The Surgeon ſhould then ſtand on that Side of the Patient which ſeems moſt convenient, and make a longitudinal Inciſion on the Outſide of the *Rectus* Muſcle between the Navel and Angle of the *Os Ilium*, where the Paracenteſis is uſually made in dropſical Subjects. The Skin and Membrana Adipoſa are to be divided for the Space of about eight or ten Fingers breadth, paſſing afterwards through the oblique and tranſverſe Muſcles, and then carefully through the Peritoneum, in which a ſmall Puncture ſhould be firſt made, and further divided by an Inciſion Knife that has an obtuſe Point (*Tab.* V.) or a Pair of Sciſſars; or in Defect of theſe, the Surgeon may introduce his Finger, and thereby defend and direct the firſt Inciſion Knife, till the Opening appears large enough to extract the Fœtus. This done, the Surgeon is to ſearch where the Fœtus is lodged: and if it be without-ſide the Uterus, in the Cavity of the Abdomen, as it has been ſometimes found, it ſhould be immediately extracted, together with its After-burthen, without further Delay. But if the Fœtus be contained in the Fallopian Tube, or in the Ovary, thoſe Parts are to be opened, and the Fœtus with its Placenta then removed. If the Fœtus appears to be concealed in the Uterus, the Caſe is much more dangerous, becauſe of the great Hæmorrhage and Injury received by that Organ, the wounding of which has been obſerved from the moſt ancient Times to be extremely dangerous [a], eſpecially in Women with Child. But there is no other Way of taking out the Child; this is alſo to be opened by a longitudinal Inciſion ſufficient to give a Paſſage to the Fœtus and its Appendages. When the Fœtus and After-burthen have been this Way removed, the extravaſated Blood is to be diſcharged with Sponges that have been expreſſed out of warm Wine: and if the Flux be great, it ſhould be leſſened with Lint dipt in highly rectified Spirit of Wine, to be applied to the divided Orifices of the uterine Veſſels, and there compreſſed by the Fingers till the Hæmorrhage ceaſes, or is much abated. The Surgeon ſhould not be terrified at the conſiderable Loſs of Blood in this Operation, if the Patient be of a ſtrong Habit, becauſe it is often uſual for them to have a violent Hæmorrhage in the natural Way of Delivery. After a ſhort Interval, to give the Patient Time to recover her Spirits, the Lint is to be taken out of the Wound and the Abdomen cleanſed with Sponges. The wounded Parts are not to be ſowed together, but dreſſed with *Balſ. Capiv.* or the like, and left to Nature: for as the Uterus naturally contracts itſelf after Delivery, the wounded Parts will probably unite together [b].

Dreſſing after the Operation.

IX. The Wound in the Abdomen is to be joined together by two or three Sutures, as we directed before in *Gaſtroraphia*, leaving a little Space open at the Bottom for inſerting a Cannula or Tent to diſcharge the Matter and other Humours from the Cavity of the Abdomen, which ſhould be cleanſed by repeated

[a] *V.* Celsus, *Lib.* V. *Cap.* 56. and Bohnius *de vuln. Lethalibus.*

[b] *Vid.* Bartholin, *Cent.* 6. *Obſ.* 92. Roonhuys, *Obſ. Chir. Lib.* II. *Pag.* 21. Solingen *Chirurg. Pag.* 776. *Vander* Wiel, *Pag.* 2. *Obſ.* 3. Mauriceau, *Obſ.* 251. *Obſ. Noſtra in Act. Acad. Natur. Curioſ. Vol.* I. *Obſ.* 176.

Injections

Injections of some vulnerary Decoction: and thus it should be continued, till more Matter is discharged, which is a Sign that the internal Wound is healed. Then the Threads of the Suture in the external Wound may be divided and extracted that it may be cicatrized. Authors generally advise the Patient to lie on her Back after the Operation: but if the Incision be made laterally, I think it better for the Patient to lie on her wounded Side, as we directed in Wounds of the Abdomen, by which Means the Matter may be discharged by Degrees, as it is made. Rossetus advises a cannulated Pessary to be inserted in the *Os Uteri*, to facilitate the Discharge of the Blood and Matter. In the mean Time, a proper Diet and Regimen with internal Medicines should be prescribed to the Patient by some prudent Physician, till the Patient recovers, which in the Case of Lanciscius was six Weeks, and the Wound easier healed. From what has been said, you will easily perceive that the Operation is attended with great Danger, especially where a large Incision is to be made in the Womb. But as there are many Instances of Patients preserved by this Practice, who, in all Probability, must otherwise have soon expired; and as we know no other Method to relieve them in this Extremity; it is much better, in my Opinion, to try a dangerous Remedy, than to give them up at once to the most miserable Tortures, and to certain Death.

Extraction of the Fœtus from an Abscess.

X. A different Method is to be taken when the Fœtus endeavours to make its Exit, not by the natural Passages, but by some Abscess or Tumor in the Abdomen, and particularly in the umbilical Region, which has been frequently observed by Authors, and particularly by Rossetus, Bauhinus, Hildanus, and Cyprianus, and in *Annal. Acad. Juliæ*, 1727, where a Tumor or Abscess was formed in the Rectus Muscle a little below the Navel, by which all the Parts of the putrid Fœtus, whose Bones I now keep by me, were extracted, and the Mother saved. In Cases of this Kind, I think it most adviseable to open the prominent Parts of the Tumor pointed out by Nature, under which the putrid Fœtus and Matter tormenting the Patient is usually concealed; which being removed, the Ulcer may be cleansed and healed as before. And if the Tumor has no apparent Suppuration, but the Patient is tormented with violent Pain in the Part, and the Tumor appears to contain something preternatural, after weighing the Circumstances of the Case in Consultation with others, it should be opened without Delay, the Bones of the Fœtus, or other corrupted Matter, should be extracted, and the Wound cleansed and healed without Suture as in other Abscesses.

When the Fœtus is contained in a Hernia, or makes its Exit by the Anus.

XI. When the Fœtus is lodged in a Kind of Sacculus or uterine Hernia, according to the Observation of Sennertus and Hildanus, which but seldom occurs; an Incision is to be made through the common Integuments, and afterwards through the dilated Uterus and including Membranes of the Fœtus, which should be then extracted, and the Remainder of the Treatment managed as before. In the Case of Sennertus and Hildanus, the Surgeon did not return the Uterus, but immediately sowed up the Wound: so that I imagine the Uterus being incapable of a Reduction afterwards, was the Cause of the Mother's Death, when the Operation had been performed the Space of four Weeks, notwithstanding the Fœtus continued alive and well. He would probably have succeeded better, if he had returned the Uterus a few Days after when it was contracted in a less Compass without making any Suture. If the

Fœtus

Fœtus should take its Course towards the Anus, the Bones making an Abscess and Passage into the Rectum [a] should be carefully extracted with the Fingers or Forceps, and the Ulcer then deterged and healed by the Use of Injections and Balsams.

XII. The third and last Case, in which the Cæsarean Section may be used, is when *the Mother and Fœtus are both living* [b] but no Possibility of a Delivery any other Way, from some of the Causes mentioned at N° 4. especially a bad Conformation of the Parts in the Mother, preventing the Surgeon from introducing his Hand [c]. In this Case the Operation is also esteemed barbarous and inhumane by the Generality of common People, and even some of the Profession, who are prejudiced with a mistaken Hypothesis, by which they had rather lose both Mother and Child by their Neglect, than save perhaps both of them by this Operation; which may be of especial Consequence in regal Families, where Peace and War, or the Devastation and Prosperity of whole Nations and Cities may depend on the Progeny. We therefore cannot help thinking it contrary to the Principles of Religion and a good Conscience, for the Surgeon to designedly neglect the Operation, when all other Means can have no Effect; according to the old Maxim, *quem non servasti, dum potuisti, illum occidisti.* To neglect saving a Person when it is in our Power, is to be accessary to his Death. Of two Evils the least is to be chose. Even MAURICEAU himself, a most ingenious and expert Manmidwife, though he generally inveighs against this Operation, could not help relating an Instance, where, after the Operation (performed by another Surgeon) the Mother indeed died, but the Fœtus was happily preserved: whereas without it they must both have been lost. But in truth it appears from several Passages in the Writings of MAURICEAU, PEU, and LA MOTTE, that they were over-ruled by the Opinions of some Divines of the Church of *Rome*, who maintain, that both the Mother and the Fœtus had better be lost, than that one should be saved by the Death of the other: and that indeed these Gentlemen, for fear of Persecution, contradicted their own Consciences. They were inwardly persuaded and convicted, that it is a much more humane and more Christian Doctrine, that one at least should be saved, where both cannot survive. But for the Operation itself, it is to be performed in the same Manner, as directed in N° 4. to 8. only more Caution should be used for fear of wounding the living Fœtus. To revive the Fœtus which is almost spent in the Operation, it may be proper to fill its Mouth with Wine, or inflate the Fume of it up its Nose, bathing its Nose with *Aq. Hung.* and washing it with warm Wine: and after tying up the Navel-string, and baptizing it, the rest may be managed as we have directed in N° 2.

Third Case in which the Operation is to be used.

[a] A large Quantity of Hair of a surprising Length, and variously contorted together, has been very often found in the Fallopian Tube, some Specimens of which I now keep by me; but as to the Cause and Manner of their Production, we are entirely in the Dark.

[b] In this Case, the Operation was first performed in *Helvetia, Ann.* 1500, as we are told by BAUHINUS *in Præf. de Fœtu exsect.*

[c] LA MOTTE will allow of the Cæsarean Section only in this Case, and on Condition that the Fœtus is living: Whereas, on the contrary, the general Advice is to perform the Operation, when the Fœtus may be reasonably supposed to be contained in the Ovary, Fallopian Tube, a kind of Hernia, or in the Cavity of the Abdomen, notwithstanding it may be dead.

Cautions.

XIII. Though I stand up for the Operation in Cases of the last Necessity, yet I am far from advising it, when there is a Possibility by any Means of avoiding so dangerous an Enterprize, by extracting the Fœtus through its natural Passages, though it could be done by no other Method than lessening it or pulling it to Pieces: nor did I ever perform the Operation but when the Mother was dead. It is certainly better to preserve the Mother, as a Tree, and destroy the Fœtus, as an irregular Branch, when its natural Birth is prevented from a bad Situation, too large a Size of Body, and particularly its Head, or from a monstrous Conformation of its Parts, rather than hazard the Life of the Mother in so dangerous an Operation, to preserve the Fœtus. I had also rather with SOLINGEN and LA MOTTE, when the Birth is prevented by a Callosity of the *Vagina*, or something amiss in the Mouth of the Uterus, prefer a Division and Dilatation of those Parts to the Cæsarean Section, as much less dangerous. The same may be also said, when the Vagina is obstructed by the *Hymen*, or some other preternatural Membrane. But when the Callosity of the Vagina is so large and hard as to render the Birth that way impracticable, if it was to be divided, and especially where the Vagina is straitened and contracted by a bad Conformation of the Bones of the Pelvis, there is then no other Means left but the Cæsarean Section.

When the Fœtus bursts out of the Uterus into the Abdomen.

XIV. If a Rupture of the Uterus should be made in the Agonies of Labour, so as to let out the Fœtus into the Cavity of the Abdomen, the Possibility of which Case sometimes happening is confirmed by many Observations [a], in that Case the Cæsarean Section may also be absolutely necessary: for there is no other Way of Delivery left, and without it both Mother and Fœtus must inevitably perish in a short Time. That the Fœtus is thus burst out of the Uterus, may be known partly from the Violence of the preceding Agonies, and straining, to no Effect; the Pain afterwards ceasing or remitting, and the Mouth of the Uterus being not at all or but little relaxed: as also from the Situation of the Fœtus and the Perception of the Mother, succeeded by trembling and a great Tumor higher up in the Abdomen than usual. It may be further confirmed by feeling, and the Appearance of great Pain in the right or left Hypochondrium, attended with fainting, raving, and convulsive Motions in the Mother. When these Signs appear, and the Fœtus does not appear to resist as usual against the Finger introduced in the *Os Uteri*, it may be reasonably supposed to have burst into the Cavity of the Abdomen. In this Case it will be necessary to make an Incision in that Part of the Abdomen made most prominent by the Fœtus, which should be then extracted, cherished, and baptized, as before. But when the Arm of the Fœtus hangs out of the ruptured Uterus, it is then extremely difficult, if not impossible, to be assured of the Case by more than Conjecture from some of the forementioned Signs. It is in my Opinion inexcuseable that the Operation should be neglected, when this Case has been sufficiently

[a] *Vide* BARTHOLIN, *Cent.* VI. *Obs.* 92. ROSSETUS, *Sect.* IV. *Cap.* IV. SCHENCKIUS, *Obs. Lib.* IV. HILDANUS, *Cent.* I. *Obs.* 64. and 67. and *Cent.* IV. *Obs.* 57. ROONHUYS, *Obs. Chirurg. Lib.* II. *Obs.* 1. SOLINGEN, *Pag.* 776. *Vander* WIEL, *Part* II. *Obs.* 30. *Miscel. Nat. Cur. Dec.* II. *Ann.* 7. *Obs.* 10. and *Ann.* 9. *Obs.* 115. SALMUTH, *Cent.* I. *Obs.* 60. MAURICEAU, *Obs.* 251. *Diar. Erud. Paris. Ann.* 1722. *Mens. Junio.* LOESCHER, *Diss. de Homine, Obs.* 12. *Act. Natur. Curios. Vol.* I. *Obs.* 176. PISTOR, *de Fœtu e rupto utero in Abdomen prorumpente* 4° *Argent.* 1726.

apparent,

apparent, of which we have several Instances wherein both Mother and Fœtus have been lost. The Operation is also necessary, when the Fœtus is generated not in the Uterus but in the Cavity of the Abdomen, which may be discovered from the Signs of Gravidation having preceded, the higher Situation of the Fœtus and Stricture of the *Os Uteri* at the Time of Delivery, with the other Symptoms beforementioned. But the Uterus is sometimes ruptured in difficult Labour, so as not to exclude the whole Fœtus, but some Part only into the Cavity of the Abdomen: even a Leg may hang out of the *Os Uteri*, while the Head and Arms are excluded through the ruptured Uterus into the Abdomen. In that Case the Cæsarean Section is not necessary. I myself once found the Arm of a Fœtus hanging out of the *Os Uteri*, while its Head was lodged in the Abdomen through the Rupture, and the rest of its Body contained in the *Uterus*. Albinus and La Motte have also observed the Head of the Fœtus rightly disposed to the *Os Uteri* and *Vagina*, while its Legs and Feet had perforated the Uterus into the Abdomen near the Diaphragm. The Fœtus in these Cases was extracted through the natural Passages by La Motte, but the Mother died a few Days after. On the contrary, I have an Instance given me by Rungius, where the Intestines of the Mother were plainly perceived by his Hand to fall down through the Rupture of the *Uterus* after the Child had been extracted: he pressed them back for some Time with his Hand from falling into the *Uterus*, till the latter had in some Measure contracted itself; and the Patient happily survived the Accident.

XV. The Difference between *Hysterotomy* and *Embryulcia*, or the Extraction of the Fœtus, (falsely called Exsection) ought to be here considered, because they are frequently confounded, even by some of the Learned, and mistaken for one and the same Thing. Embryulcia is the Extraction of the Fœtus by the natural Passages without any Incision, either in the Uterus or Abdomen; both which are divided in Hysterotomy, or Exsection of the Fœtus by the Cæsarean Operation. If we admit this Abuse of the Terms, what Scipio Mercurius tells us may be in some Measure true, that the Exsection of the Fœtus was in his Time as common in *France* as bleeding for the Head-ach was in *Italy*. By such a mistaken Way of Speaking, even among knowing People, Women are intimidated and afraid to call in the Assistance of a Surgeon in difficult Births, for fear the Child is to be cut out of the Belly: whereas the Fœtus is generally extracted in those Cases, by nothing more than the Hands, and at most without any Pain by Instruments, through the natural Passages.

The Difference between Hysterotomy and Embryulcia.

XVI. As a monstrous Fœtus, which consists of two Bodies, two Heads, *&c.* cannot be delivered from the Mother entire by the natural Passages, it may be asked whether the Cæsarean Section should be made for it, to the Hazard of the Mother's Life, or whether the Fœtus may be lessened, and so extracted in Pieces. Roonhuys is for the Operation; but for my own Part I must consent with the universal Opinion, that it is better to destroy the monstrous Birth than hazard the Mother's Life, and possibly destroy both. Mellius, a late Writer in *Italy* on the Art of Midwifry, condemns the Cæsarean Section, while the Mother is living. He asks this question: whether the Mother should be exposed to Danger for the sake of a Monster? Certainly not. So far I quite agree with him. But he is not aware that there are other Cases, beside that of a

Whether the Cæsarean Section should be made for a Fœtus when monstrous.

monstrous Fœtus, which require this Section; and where I think I have proved that the Operation, however dangerous, ought not to be omitted by the Surgeon.

Whether the Operation may be practised when the Head of the Fœtus will not pass through the Vagina.

XVII. It may be again asked, whether the Cæsarean Section may be performed when the Head of the Fœtus is so large, and the natural Passages so strait, that the Head is wedged in the internal *Os Uteri* or *Vagina*, so that it will neither move one Way nor another, the Fœtus usually dying within three Days, which is deservedly reckoned the most difficult Case in Midwifry, as both Mother and Fœtus are in Danger of speedy Death. Therefore, as the Head of the Fœtus cannot be held from its Slipperiness and Narrowness of the Passages, and as the Hand cannot be introduced [a] to alter its Position in the Uterus, and as no Instrument can lay hold of the Head to extract the Fœtus without killing it; the Question is on these Accounts started, whether the Cæsarean Section may be made to preserve the Fœtus? It is the Opinion of most, that neither the Cæsarean Section nor lessening of the Fœtus should be made while either of them are living: but they had rather, according to the Opinion of the Roman Church, that both should perish, than that one should survive at the Expence of the other's Life. They also equally condemn the Cæsarean Section, notwithstanding the many Instances of both surviving the Operation. We are told by Roonhuys it was performed seven Times by D. Sonnius, Physician at *Bruges*, upon his own Wife, with Success both to the Infant as well as the Mother. The celebrated Olaus Rudbeck is also said to have performed the Operation with Success upon his own Wife, the Fœtus also surviving. They will not therefore allow of extracting the Fœtus by Instruments [b], because that hazards the Life of the Fœtus as much as the Cæsarean Section does the Life of the Mother.

XVIII. But though some vainglorious Men may assert that they can always extract the Fœtus, by their Hands only; I dare maintain that it is often impossible: and yet if proper Aids be not timely applied, before the Mother's Strength is quite exhausted, there is great Danger of losing both. What therefore must be done by a prudent Physician and good Christian in so difficult a Case? In this Difficulty, my Opinion is, that the Cæsarean Section should never be performed on account of its great Danger to the Life of the Mother, but when it is strictly commanded by a King or Prince, who is without Heir, to keep up the Line; or in some of the Cases mentioned at N° 12. especially when the Mother is willing to undergo the Operation, to save her Infant. But without those Conditions, the Surgeon should rather wait as long as the Mother's Strength will permit, and endeavour to assist her Delivery with his Hands, till he presumes the Fœtus to be dead, which may be then extracted with Instruments. But if the Fœtus be yet living, the Mother's Strength fails her, and malignant Symptoms are drawing on, while excruciating Pains make her cry out for the Surgeon's Assistance; it is then better to save the Tree for future Productions, by a timely Extirpation of the offending Branch, than to lose the whole by Delay. If the Infant dies by the

[a] As I have frequently found by Experience, with the Consent of the best Practitioners in Midwifry, notwithstanding some boast they can always invert the Fœtus with their Hands.

[b] The Extraction of the Fœtus by Instruments in impracticable Births is advised by Riolan, *Enchirid. Anat. Lib.* II. *Cap.* 28. and Ammanus, *Med. Crit. Cas.* VI. *Pag.* 26. Deventer, *loc. cit. Part* II. Horatianus, *Lib.* III. *Cap.* VI. Sigismunda, *Lib. cit. Cap.* V. *aliique.*

Operation, it is not done voluntarily, but by Accident, to ſave the Cauſe (which is always greater than the Effect) to which, next under God, it owes its Being. Some will perhaps ſay cantingly, that it is againſt the ſixth Commandment, *Thou ſhalt not kill*; and that an Evil is not to be committed for the Production of Good, and the like. But I think the Matter clear enough to obviate thoſe Quibbles of itſelf, and ſhall therefore leave it. The Surgeon is ſo far from killing, that he moſt ſtudiouſly endeavours to ſave the Life both of the Fœtus and Mother: but if both cannot be ſaved, it is beter to ſave one than neither. More may be ſeen on this Subject in BECKERUS, *De Infanticidio licito ad ſervandam puerperam*, where theſe Objections are obviated at large, and the Caſe put in a clear Light. ROSSETUS has written learnedly and profeſſedly on the Cæſarean Birth. But thoſe who have not his Treatiſe, may ſee a Compendium of it in SCULTETUS's Explanation of the Table belonging to the *Sectio Cæſarea*, which, in the *Francfort* Edition, is *Tab.* XLII. but in that at *Amſterdam*, it is *Actuar.* I. *Tab.* X. *Pag.* 29.

CHAP. CXIV.

Of Herniæ or Ruptures in general, and particularly of the Umbilical, and its Method of Cure.

I. THE Generality of preternatural Tumors formed in the Abdomen, and particularly the Navel, Inguen, and Scrotum, by a Protuberance of the Inteſtines or Omentum, are uſually diſtinguiſhed by the general Name of Herniæ or Ruptures. Theſe Tumors differ firſt according to their *Place or Situation*. Thoſe formed at the Navel are called *Omphalocele* or *Exomphalos*; thoſe in the Groin *Bubonnocele*; and thoſe of the *Scrotum*, *Oſcheocele*, *&c.* They are alſo, ſecondly, diſtinguiſhed from the Body of Subſtance contained in or forming the Tumor. When they proceed from a Protuberance of the Inteſtines, they are called *Enterocele*; when from the *Omentum*, *Epiplocele*; if from Flatus or Wind, *Pneumatocele*; and if from Water, *Hydrocele*, *&c.* They are alſo diſtinguiſhable by Circumſtances leſs remarkable: as from their Size, being either ſmall, large, or enormous; from their Conſiſtence, being either hard, ſoft, fixed, or moveable, capable of being returned into the Abdomen or not; which latter are called *adheſive* Ruptures. Sometimes the Parts prolapſed are ſo confined by Stricture and Inflammation that the Flatus and Fæces cannot be returned; which kind of Ruptures are called *incarcerated*. Some are free from Pain, others attended with it, or with Sickneſs, Vomiting, and other bad Symptoms, particularly the *incarcerated*. And with Reſpect to their Duration, they are very properly diſtinguiſhed into *recent* and *inveterate* Ruptures: which Conſideration is of great Uſe in the Method of treating them. Of Ruptures in general.

II. An *Omphalocele*, *Exomphalos*, or *Hernia Umbilicalis*, is a preternatural Tumor of the Abdomen at the Navel, from a Rupture or Diſtention of the Parts which inveſt that Cavity. Theſe Ruptures differ by their Size and Figure: ſome being ſmall, eſpecially when recent; others large, and ſometimes monſtrous. Some are of a round Figure, others acuminated or cylindrical: and Deſcription and Kinds of the Omphalocele.

I lately

I lately obſerved an umbilical Rupture in a Woman with Child, which reſembled the Size and Figure of the Penis, and was very painful, but contained nothing except Wind or Air. Umbilical Ruptures are again diſtinguiſhed according to their Contents: as, if from the Inteſtines, *Enteromphalocele*; from the Omentum, *Epiplomphalocele*; if from Air or Wind, *Pneumatomphalocele:* Some of theſe Tumors are again diſtinguiſhed by their Conſiſtence, into hard or ſoft, returnable or not, painful or incarcerated, *&c.* Figures of theſe Ruptures have been exhibited by SCULTETUS, *Armament. Chirurg. Tab.* XXXVII.

Cauſes of an Exemphalos.

III. Theſe Tumors ariſe from various Cauſes. But the immediate Cauſe is always ſome Force exerted upon the Abdomen, eſpecially near the Navel; ſuch as a violent and ſudden Motion, a Fall, violent Blow, or Leap, ſtrong Coughing or Sneezing, ſtraining to lift great Weights, difficult Labour in Women, and the like: by which Cauſes the *Peritonæum* at the Navel is either dilated, or ſometimes quite broke, as DIONIS obſerves, eſpecially when that Membrane is weaker or more relaxed than uſual. The dilated Parts at the Navel contain ſometimes the Omentum and Inteſtines, either ſeparate or together, and ſometimes only Wind or Flatus. A natural Weakneſs and Relaxation of the *Peritonæum* at the Navel, may be often the Cauſe of its being diſtended with the Inteſtines or Omentum in Children; eſpecially when aſſiſted by ſome Violence, as thoſe beforementioned, or ſtrong Crying: which frequently produces this Diſorder ſoon after the Birth, as I have ſometimes obſerved, eſpecially if the Abdomen and Navel-ſtring are not properly ſecured by rolling.

Diagnoſis.

IV. This Diſorder diſcovers itſelf both to the Eye and Touch. The Navel appears more prominent or protuberant, than in its natural State; and the Tumor being preſſed with the Fingers uſually returns into the Abdomen, (except there is an Adheſion) affording a Sort of flatulent Sound, eſpecially when the Patient is laid on his Back, which is a Sign that the Tumor ariſes from a Prolapſus of the Inteſtines. When the Tumor gives little Reſiſtance, and appears very ſoft, it may be reaſonably ſuppoſed diſtended with Flatus, or with the Omentum only: though the latter is uſually accompanied with the Inteſtines, as it lies before, and is protruded by them. When the Omentum only is concerned, it is called *Hernia Omenti*; when only the Inteſtines, *Hernia Inteſtinorum Umbilicalis.* If upon returning the Inteſtines into the Abdomen the Tumor appears to be ſtill in ſome Meaſure diſtended, we may reaſonably conjecture, that it is alſo formed in Part by the Omentum, which may be ſometimes returned together, with the Inteſtines. The Navel is alſo frequently obſerved to be greatly diſtended with Water in dropſical Subjects: remarkable Inſtances of which have been given and repreſented by SCULTETUS and PURMANNUS *Chirurgia Curioſa, Pag.* 330. *Tab.* V. But theſe Tumors are diſtinguiſhable from the reſt by the hydropical Habit of the Patient, and may be called *Hernia umbilicalis aquoſa*, as that containing Air may be termed *ventoſa* or *flatulenta.*

Prognoſis.

V. The *Omphalocele* in Infants is uſually without Danger, and may be generally returned and cured without much Difficulty: nor is it to be judged dangerous in Adults, ſo long as the prolapſed Parts may be freely returned without any Adheſion. But if it proceeds from a Prolapſus of the Inteſtines through a very narrow Aperture, occaſioned by ſome Violence in Adults, ſo that it cannot be returned; there is then great Danger of a Mortification in the Inteſtines

preceded

preceded by Inflammation, violent Pain and Vomiting, and ſometimes the iliac Paſſion, in which the Fæces are voided by the Mouth; all which will probably terminate in the Death of the Patient. But when the Diſeaſe has advanced but ſlowly, and the Perforation in the Peritonæum is yet ſufficiently open to return the Inteſtines, the Patient is then in no great Danger, eſpecially if it be an Infant or Child. If no Aſſiſtance can be had immediately from the Surgeon to keep the Parts in their proper Situation, they ſhould be defended from the Cold, the Patient ſhould abſtain from violent Exerciſe, and live upon a ſpare, light, and animal Diet, which affords no Flatus. But when the Diſorder is become inveterate in an Adult, attended with the bad Symptoms before mentioned, we too often find by Experience, that all chirurgical Operations, which are uſually applied in theſe Maladies will be to no Purpoſe, eſpecially if the Hernia be large, in which Caſe the Patient frequently dies, either in or ſoon after the Operation. When the Inteſtines are returnable into the Abdomen in Infants and Children, this Diſorder may be ſometimes cured by a proper Girdle or Bandage, Diet, and Regimen, ſo as to be in no danger of returning, if they avoid violent Exerciſe, and obſerve a proper Regimen. If the Contents of the *Omphalocele* appear to be Wind or Flatus, there is little or no Danger: but if it contains Water, it threatens a conſequent Dropſy.

VI. The Method of Cure is twofold; according as the Inteſtines are returnable into the Abdomen or not: if the firſt can be practiſed, it ſhould be done without any Delay, and the Parts ſecured againſt a future Relapſe. When the Surgeon therefore finds that the Aperture, through which the Inteſtines have been forced, is large enough for this Purpoſe, the Patient is then to be laid on his Back, and the Parts gently preſſed with the Hands and Fingers till he perceives they are returned; after which, the Remainder of the Treatment differs according to the Age of the Patient. In young Infants it may be frequently ſufficient, as I have experienced, to prevent a Return of the Inteſtines and Omentum by a Compreſs or Lump of *Empl. ad Herniam:* which being applied to the Navel, is to be retained by a Plaſter of the ſame Kind; over that a ſimple but thick Compreſs, with a common Linen Bandage of about three Fingers breadth, carried circularly round the Abdomen, obſerving to make it a little tigher at every Dreſſing: by which Means a Cure may be often compleated in a few Weeks. But in a worſe Kind of the Diſorder, I uſe a double Compreſs, putting a thin Plate of Lead into the leaſt and lowermoſt, binding it up on the Part as before. In Children, Adults, and old People, it will be neceſſary to uſe a kind of Girdle fitted with a Plate or Ball, as CELSUS obſerves, which are to be faſtened round the Abdomen to prevent a Relapſe of the Inteſtines or Omentum, like that repreſented in *Tab.* XXIV. *Fig.* 6. which is made of Leather, and the other at *Fig.* 7. of Steel: though there are ſeveral others of the like Kind, which are not contemptible in this Diſorder. See SCULTETUS, *Tab.* XXXVII. *Fig.* 6. But before an Inſtrument of this Kind is uſed, the Parts ſhould be firſt ſecured with a Cake of Emplaſter, Compreſs, and Bandage, as before, the Succeſs of which I have frequently experienced in young Subjects, who, by continuing the Girdle for ſome Months only have been thoroughly cured. But in Adult and old People this Inſtrument ſhould be

1ſt Method of Cure.

wore

wore through the whole Courſe of their Life; or they will be in continual Danger of relapſing upon any Violence, which they ſhould cautiouſly avoid.

The ancient Method of Cure.

VII. The preceding Method therefore appears upon Examination to be only a partial Cure in Adults: nor do we find any abſolute Method of curing the Diſorder, ſo as to prevent a Relapſe, deſcribed by any of our modern Surgeons, except SAVIARD. We are informed by the excellent CELSUS, that the Ancients were very ſolicitous to remedy this Diſorder, for which they contrived various Methods; the chief of which we ſhall here tranſcribe for the Information of the Surgeon. He ſays "the Patient is to be firſt laid upon his Back, "that the Inteſtine or Omentum may be returned into the Abdomen: and the "umbilical Perforation being then empty, the Slit is to be tied together from "the Bottom with a Needle and two Threads, each of which are to be faſten-"ed with two Knots on oppoſite Sides of the Wound: by which Means the "Parts above the Ligature will be compreſſed, withered, and fall off, and a "firm Cicatrix formed beneath." Some make a longitudinal Inciſion before they undertake this Method, that by introducing their Finger the Inteſtine and Omentum may be thereby returned, and to prevent the Inteſtine and Omentum from being made faſt to the Wound. Others again cauterize the Parts, that have been thus ſecured, either with Cauſtics or the actual Cautery, to make the ſtronger Cicatrix: after which, they cure the Wound, like others from burning. This Method is not only the beſt, where there is a Rupture of the Inteſtine, Omentum, or both, but alſo in humoral Ruptures: but it requires the Patient to be of a good Habit, and neither an Infant nor an old Perſon. So far CELSUS agrees with the Obſervations that have been made by many of our modern Surgeons, in order to render the Cure of this Diſorder more perfect in Adults.

SAVIARD's Method.

VIII. SAVIARD, a Surgeon at *Paris*, had the Care of a little Girl of 14 Months old, who had an umbilical Rupture about the Size of a Gooſe Egg. After laying the Child on its Back, and returning the Inteſtines, he gave it to an Aſſiſtant to be held upright; and then tied up the Skin round the Bottom of the Tumor, with a Wax Thread foulded four Times together. After two Days time he renewed the Ligature, whereupon the Tumor began to putrify: and in three Days time more he made a third Ligature tighter than either of the former; by which the Tumor was entirely ſeparated, and the Girl cured. The ſame Method was afterwards repeated with Succeſs upon another Girl, as he informs us, in *Obſ. Chirurg.* 9. It is a little ſurprizing, that GARENGEOT takes no Notice of this Method of Cure: and SAVIARD himſelf does not inform us, whether the two Children were not curable by Bandage, and the more ſimple Method at N° 6. before he undertook this more ſevere Practice.

IX. If the Inteſtine cannot be returned, through the Straitneſs of the Aperture in the Peritonæum, but the Patient is tortured with violent Pain in the Part affected, with Vomiting and other bad Symptoms; to apply the Girdle or Bandage in that Caſe, would be not only uſeleſs but pernicious. The Patient ſhould be rather treated with emollient Clyſters and Cataplaſms, to relax the Parts and facilitate their Return. But if thoſe are not ſufficient, after they have been continued ſome Time, and the Inteſtine cannot be yet returned, it may be of great Service to the Patient to inject the Smoak of Tobacco by the Tube repreſented in *Tab.* XXXIV. *Fig.* 12. inſerted in the Anus, till the Inteſtines are thereby

thereby relaxed and discharged of their Contents. From this *Clysma Fumosum* I have often experienced surprizing Success. If the Patient is of a full Habit, and inclined to be feverish from the Pain and Inflammation of the Parts, it may be then proper to bleed, as in other inflammatory Disorders; and afterwards bathe the Tumor with *Sp. Vini*, or with red Wine: by which Means the distended Vessels of the Intestine will be contracted, and probably afterwards be returned by a gentle Pressure of the Hands, to be then secured with Compress, Bandage, and a proper Instrument as before.

X. If the Disorder continues four and twenty Hours, and becomes still worse after Bleeding and the Use of other Medicines, the Surgeon should then immediately proceed to the Operation, without which there will be but small Hopes of the Patient's surviving. And even then, if the Disorder has continued above a Day and Night in a young Person of a full Habit, the inflamed Part of the Intestine will be probably found mortified, and the Operation of no Effect: but the Patient soon after expires, with a violent Vomitng, Weakness, and cold Sweats. For the Operation itself, it consists chiefly in dilating the Wound of the Abdomen, so as to make it large enough to return the Intestine. In order to this the Patient should be laid upon a Bed or Table, with his Head depressed, and his Abdomen and Back-side elevated, and being secured by Ligatures or the Hands of two or three Assistants, the Surgeon proceeds to make a transverse Incision through the Integuments, which should be held up in the opposite Part by an Assistant; taking Care not to wound the Intestine with the Scalpel. Upon which Account it may be safer to make a small Puncture, and insert the Director *Tab.* I. *Lit. M. N.* under the Skin to guide the Knife. And if the Tumor be large, so that a longitudinal Incision be not sufficient, a cruciform Incision may be made, and the four Angles of the Integuments elevated carefully with the Knife and Fingers, so as not to injure the Intestine. After which the dilated Peritonæum, which immediately invests the Intestine, may be carefully elevated, and dilated with as small an Incision as possible; guiding the Knife in a Director to avoid injuring the Intestine, which may be afterwards depressed and returned into the Abdomen, as we before directed, in treating of a Prolapsion of the Intestines by a Wound of the Abdomen. *Part* I. *Book* I. *Chap.* V. The Surgeon may avoid injuring the Intestine by dividing the Peritonæum with a Pair of Sciffars, having obtuse Points; or with a Scalpel that has a Button upon its Point, as in *Tab.* V. *Fig.* 3, 4, 5. or by otherways securing the Point with his Finger, which should be conveyed with it into the Abdomen, till he has made an Opening large enough to return the Intestine. When the Omentum is hurt, which often happens, you should make a Ligature on the corrupted Part, that it may separate from the sound. If it is very much corrupted, you must apply different Ligatures in different Parts, and cut off what is superfluous: thus you will prevent an Hæmorrhage. Where the Omentum and Intestines are sound, a linen Ball should be applied to the Middle of the Wound, the neighbouring Parts filled with dry Lint, covered with a thick Compress, and secured with a slight Bandage. But if the Parts are vitiated, you must dress only with the Lint and Compress; and then heal it, like other Wounds of the Abdomen.

Cured by Incision.

New Inſtruments deſcribed.

XI. Inſtead of the preceding Inſtruments, to avoid injuring the Inteſtines in dilating the Peritonæum, modern Surgeons have contrived others more ſafe, and particularly the Director, *Tab.* XXIV. *Fig.* 8. furniſhed with a Pair of Wings, AA, to preſs down the Inteſtine while the Scalpel is directed in its Groove. To dilate Wounds of the Abdomen, which intercept and ſtrangle the Inteſtines, MORAND has contrived a Sort of Knife, called by the *French* a *Gaſtroraphic Biſtouri*, *Tab.* XXIV. *Fig.* 9. which I forgot to mention in treating of Wounds of the Abdomen. This Inſtrument being inſerted into the Abdomen by its obtuſe or probe End, marked A, up to B, the two Handles CC, are then opened with the Fingers like a Pair of Sciſſars; and the moveable Arm D, having a ſharp Edge like a Scalpel on its upper Margin EE, the narrow Aperture is thereby divided or dilated, till it is large enough to return the Inteſtine. For the ſame Purpoſe, in Ruptures, LE DRAN has invented a Kind of a latent Scalpel, *Tab.* XXIV. *Fig.* 10, 11. The firſt Figure ſhews the Inſtrument ſhut or concealed; but in *Fig.* 11. it appears open with all its diſtinct Parts. The Part AA, *Fig.* 10. is inſerted into the Foramen of the Peritonæum, to be dilated: and the Handle K being held in the right Hand, the Plate F is depreſſed with the Thumb; by which Means the Scalpel concealed in the Groove AA, is elevated as in *Fig.* 11. *lit.* CD, in ſuch a Manner, that the Point D always remains in the Groove, that it cannot wound or prick the Inteſtines, while the Edge between C and D divides the Peritonæum. But we ſhall give a more ample Deſcription of this Inſtrument in our Explanation of the XXIVth Plate following.

The Dreſſing.

XII. When the Inteſtines have been returned by either of theſe Means, the Lips of the Wound are to be held and compreſſed by an Aſſiſtant, till they have been ſecured by the knotted Suture: after which it is to be dreſſed and healed, as we have before directed, in *Part* I. *Book* I. *Chap.* V. concerning *Gaſtroraphia*. After the firſt Dreſſing the Patient ſhould reſt in an eaſy Poſture for three or four Days, before it be again renewed, to promote the Agglutination of the Wound, unleſs ſomething forbid. After the firſt Opening, the Wound may be then dreſſed every Day, and retained with a ſtrict Bandage, as in other Wounds of the Abdomen: and when the Wound is healed, it will be ever after neceſſary for the Patient to wear a Girdle, to ſtrengthen the Parts, and prevent a Relapſe of the Diſorder. But if the Patient was an Infant or Child, the Parts frequently unite ſo firmly as to require no ſuch Aſſiſtance.

PETIT's Method of Cure deſcribed.

XIII. We ſhall, for the Satisfaction of our Reader, here tranſcribe the Method recommended by PETIT, as we find it briefly inſerted in the chirurgical Operations of GARENGEOT. Firſt, the Integuments upon the Tumor are to be elevated on one Side by the Hand of the Surgeon; and on the other, by an Aſſiſtant: after which a cruciform Inciſion is to be made, and the Lips of the Wound are next to be raiſed or dilated, either with a Scalpel and Director alone, or aſſiſted with the Fingers. The Membrane of the Peritonæum then appearing, is to be carefully divided with a crooked Scalpel; and the Index, or elſe the middle Finger introduced, that the crooked and obtuſe pointed Sciſſars (*Tab.* I. *Fig.* D) may be thereby directed, to divide the Sacculus in a croſs Poſition. And if any Part ſhould be found to adhere preternaturally, as the Omentum and Inteſtines ſometimes do, they are to be carefully ſeparated or divided

by

by Inciſion. If now the Omentum does not appear to have fallen through the Ring of the Navel, it is a good Sign. But if the contrary, and it appears much enlarged, the Diſorder is dangerous, whether it be returned or cut off: and notwithſtanding the prolapſed Inteſtines are often returned in this Manner, Death ſometimes follows. Yet they ought to be decently replaced, if the Aperture of the Peritonæum is large enough; but if it is too ſtrait, it ſhould be dilated with a Scalpel, armed with a Button at the Point, as in *Tab.* V. *Fig.* 3, 4, 5. which being introduced, is to be directed obliquely upward and towards the left Part of the Abdomen, to make the Dilatation. But if the Hernia or Tumor is not very large, PETIT's Method is then to dilate the Peritonæum without Inciſion, and to return it together with the Inteſtine: but in what Manner he dilates the Aperture of the Peritonæum without Inciſion, he does not acquaint us, nor can I eaſily imagine.

XIV. After the Operation he proceeds to a Deligation and Cure of the wounded Parts. This he orders to be done without Suture, by a Ball of Linen, which he calls a Pellet, dipt in the White of an Egg; which being faſtened to a Thread is applied to the Foramen, through which the Inteſtines were prolapſed. The reſt of the Wound is then filled with Bits of Linen rolled up with Cylinders of ſcraped Lint, in French *Bourdonnets:* then, after anointing the external Parts of the Wound with Oil of Roſes, three or four Compreſſes one larger than another are applied over the whole, and retained by the Napkin and Scapulary. The next Day he directs the Pellet or Ball to be removed from the Aperture of the Wound, notwithſtanding its firm Adheſion: after which, he tells us there remains no Veſtigia or Appearance of the late Foramen or Wound. But how the reſt of the Wound is afterwards to be healed, he does not tell us. For the reſt of the Cure, eſpecially for the firſt Days, Bleeding, Clyſters, and a proper Diet, are judged greatly to contribute.

The Dreſſing uſed by PETIT.

XV. DIONIS, in his Surgery, tells us, that the *Exomphalos* never proceeds from a Dilatation, but a Rupture of the Peritonæum: and that therefore the Inteſtines are not to be found near the Cutis and Integuments, nor lodged in a Sacculus, according to the received Opinion. But that DIONIS is greatly deceived in this Notion, may appear from the forecited Obſervations of LE DRAN, publiſhed *Ann.* 1722. *Pag.* 188. as well as from an Obſervation of my own. During my Profeſſorſhip at *Altorf*, a Nobleman of a luſty and obeſe Habit had an Exomphalos, as repreſented in *Tab.* XXIV. *Fig.* 12. where the Letters AAAA denote a kind of large Ring in the Integuments or near the Navel: in this was contained the Peritonæum dilated and pellucid, through which might be ſeen the Inteſtines BBB in the living Subject. So long as the Patient wore a Girdle, with a hard Compreſs or Pillow upon the Part, repreſented in *Tab.* XXIV. *Fig.* 6. the Inteſtines remained in the Abdomen in their natural Poſitions: but upon removing the Supports, the Inteſtines immediately protruded into the thin Membrane, forming a Sort of Bag, protuberant at the Navel. It is probable, other Surgeons and Phyſicians may have made Obſervations of the like Kind; and at leaſt, I have GARENGEOT and PALFYN agreeing with me in Oppoſition to DIONIS, who both affirm that the Inteſtines are contained in a kind of Sacculus or Dilatation of the Peritonæum. But we are not totally to deny, that the Opinion of DIONIS may ſometimes be true: for ſome Caſes have been doubtleſs obſerved, as well in dead as living Subjects, where the In-

The Opinion of DIONIS examined.

teſtines have not been confined in a Sacculus of the *Peritonæum*, but protruded under the Integuments, through a Rupture of that Membrane. However, the Surgeon ſhould be careful not to be impoſed upon, by miſtaking the Inteſtine itſelf for the Sacculus, the wounding of which would perhaps be fatal.

An EXPLANATION *of the* TWENTY FOURTH PLATE.

Fig. 1. The *Trocar*, conſiſting of a triangular pointed ſteel Bodkin, included in a ſilver Cannula, ſerving to tap or perforate the Abdomen and Scrotum in dropſical Patients. A, its Handle; B, its triangular Point; CC, the including Cannula or ſmall Pipe.

Fig. 2. and 3. is the ſame Inſtrument aſunder. BC, the ſteel Bodkin that makes the Perforation; A, its Handle (*Fig.* 3.) is the ſilver Cannula or Tube; AA, the Part to be inſerted into the Abdomen. C, Two oval Apertures on each Side, that the Water may enter not only at the End, but on each Side; BB, a round Plate, with two ſmall Holes, by which it may be faſtened to the *Abdomen*. D, the Orifice of the Tube, by which the Water is diſcharged.

Fig. 4. Repreſents another kind of Cannula for the ſame Purpoſe invented by PETIT. AA, a long Slit in the Cannula in its upper Part, which the Inventor ſuppoſes will promote the Diſcharge of the Water. B, the Aperture, by which the ſteel Bodkin enters, and the Water is diſcharged. CC, another Plate made hollow like a Gutter, by which the Water is conveyed down into ſome Receptacle.

Fig. 5. Is an Inſtrument for the crooked or hump-back made of Steel, in the Form of a Croſs. AAAA, the cruciformed Part, which is applied to the Back and Shoulders. BB, a ſteel Collar for the Patient's Neck, which ſhould be lined with Silk or Leather, and may be taken up or let out by the Claſp aa. CC, are two Girts of Leather, to be faſtened round the Shoulders, the Left being open to ſhew the ſmall Holes, by which it is to be faſtened with a tagged Lace: the Right ſhews the Manner it is to be faſtened to the Shoulders. EE, is a Girdle paſſed through the Holes F, to be faſtened round the Waiſt.

Fig. 6. Repreſents a kind of Belt for depreſſing the umbilical Rupture. A, is a ſteel Truſs covered with Leather or Linen Cloth, which is to be applied to the Navel upon Cotton, over the Compreſſes and Plaſter, being furniſhed with a Protuberance or Button in its Middle, repreſented at D. BBB, is the Girdle of Leather or Linen Cloth faſtened by the Buckle C.

Fig. 7. Is another Inſtrument for the ſame Purpoſe, made of ſtrong Braſs or ſteeled Wire, bent in the particular Manner here deſcribed. A, the Part applied to the Navel; BB goes round the Abdomen; and CC are applied to each Inguen: and thus by the Elaſticity of the Inſtrument the Navel and Abdomen are compreſſed: before it is uſed, it ſhould be covered with ſoft Leather or Callico, and the Part A ſhould be filled up with boiled Horſe-hair, or ſuch other like Subſtance, and the whole is to be adapted to the Size of the Patient.

Fig. 8. Is a Director to guide the Knife and prevent it from injuring the Inteſtine in the Operation for Hernia's. AA, two Plates in the Form of a Heart to preſs down the Inteſtine, that it may not be wounded by the Edge of the Knife.

Fig. 9.

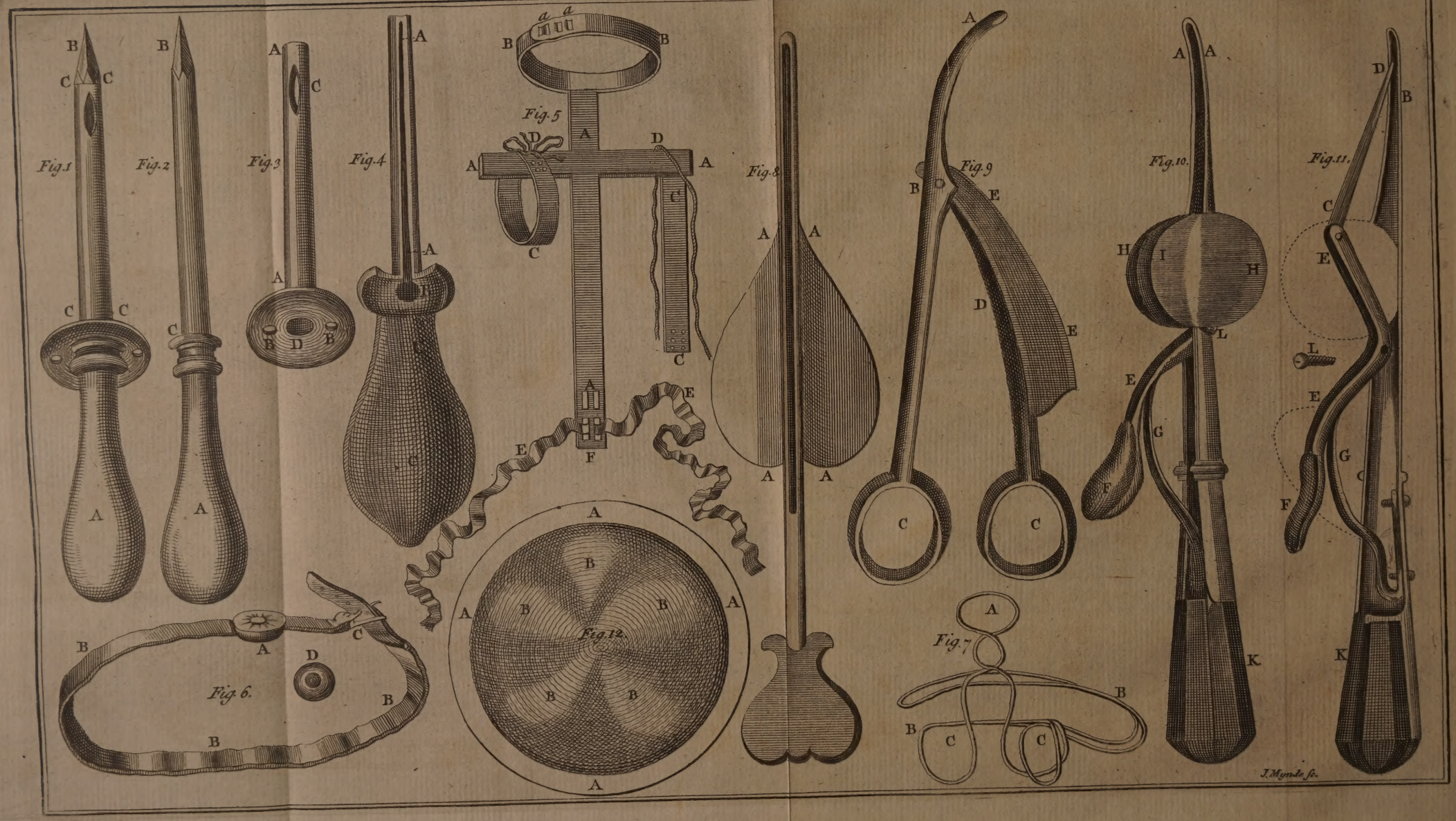
Fig. 1
Fig. 2
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Fig. 5
Fig. 6.
Fig. 7
Fig. 8
Fig. 9
Fig. 10.
Fig. 11.
Fig. 12.
J. Mynde sc.

Fig. 9. The Gaſtroraphic Inciſion Knife of MORAND, to be uſed in the ſame Caſe with the preceding. A, is the obtuſe or probe End to be inſerted into the Abdomen; B, the Hinge, by which the two Parts of the Inſtrument are joined; CC, the Handles for the Fingers; D, the moveable Arm of the Inſtrument, which is round and obtuſe in its lower Part, but with a ſharp Edge EE upward, by elevating which the Parts are to be divided and dilated.

Fig. 10, 11. Repreſents the Scalpellum Herniarium or Biſtouri of LE DRAN. The firſt repreſents it cloſe, but *Fig.* 11. ſhews it open, that its internal Structure may be the better perceived. AA, a hollow Director, in which is concealed the ſmall Inciſion Knife C, which is in the open Figure elevated out of its Groove B; D, the Point of the Scalpel, which moves in the Groove, being faſtened, that it cannot ſlip out; EE, the Leaver, which elevates the Scalpel; F, the Handle of the Leaver, which is depreſſed by the Thumb to elevate the Scalpel; G, a ſteel Spring, which elevates the Leaver when it is not preſſed by the Thumb, by which Means the Scalpel is again concealed in the Groove; HH, two lateral Wings, which cover and defend the Inteſtine; II, two exact Wings, which include and ſuſtain the Leaver; K, the Handle of the whole Inſtrument; L, the Screw upon which the Leaver turns.

Fig. 12. Repreſents a large Tumor or *Hernia Umbilicalis*. AAAA, the Skin of the Navel very much diſtended in the Form of a Ring, above two Inches diameter, in which appeared a thin pellucid Membrane, the Peritonæum, through which might be ſeen the ſmall Inteſtines BBBB contained in the Abdomen.

CHAP. CXV.

Of other HERNIÆ, *and particularly thoſe of the Abdomen, or the* HERNIA VENTRALIS.

Hernia Ventralis deſcribed, with its Kinds.

I. WE have already obſerved, that a Protuberance at the Navel cauſed by the Inteſtines or Omentum, is termed *Omphalocele* or *Hernia Umbilicalis*. But when the Inteſtines or Omentum cauſe a Tumor in other Parts of the Abdomen, it is differently denominated: *Oſchiocele*, when in the Scrotum; *Hernia Inguinalis*, when in the Groin; *Cruralis*, when in the upper and anterior Part of the Thigh; and *Ventralis*, when in any other Part of the Abdomen; as is ſometimes obſerved in the *Linea Alba*, either above or below the Navel. Theſe *Herniæ* are uſually diſtinguiſhed into *true* and *ſpurious*. The true are thoſe formed by a Prolapſion of the Inteſtines or Omentum. The Spurious are thoſe formed by other Bodies, as the *Hydrocele*, *Sacocele*, *Varicocele*, &c. We ſhall firſt conſider the *Hernia Ventralis*, which has been either ſlighted or wholly neglected by the chirurgical Writers of the laſt Century. But as the Diſorder is not only deſcribed by the Ancients[a], but alſo frequently occurs in our own Time, ſome Inſtances of which I have had myſelf, it will be agreeable to our Undertaking to conſider it particularly in this Place. As to their

[a] See CELSUS, B. vii. C. 17.

Difference,

Difference, ſome are large, others ſmall, and ſeated either in the Middle or on the right or left Side of the Abdomen. Some are eaſily returned again into the Abdomen, attended with no Inconvenience: others cannot be returned, are attended with grievous Symptoms, and are therefore called incarcerated.

Cauſes. II. With Regard to the Cauſes of theſe Diſorders, there are two Opinions. DIONIS and others will have them proceed from a Rupture of the *Peritonæum* by ſome Violence. Whereas GARENGEOT will have them to proceed not only from a Rupture of that Membrane, but more frequently from a Dilatation of the *Peritonæum*, when it is not equally preſſed by the abdominal Muſcles, through a Wound, Relaxation, or other Defect, eſpecially in the tranſverſe Muſcles: ſo that by the ſtronger Action of the other Muſcles the Inteſtines are forced, and the Peritonæum dilated in that Part where there is the leaſt Reſiſtance.

Diagnoſis. III. A *Hernia Ventralis* may be diſcovered from the Tumor and Inequality of the Integuments more in one Part than in another. The Tumor itſelf gives Way to the Preſſure of the Hand and returns into the Abdomen: but upon removing the Hand it returns again with a Sort of murmuring Noiſe. When the Patient coughs, breathes deep, or ſtrains, in lifting any Weight, or going to ſtool, the Tumor then increaſes and affords a greater Reſiſtance to the Touch. But in the incarcerated Kind, when the Inteſtine cannot be returned, the Diſorder is alſo accompanied with the Symptoms belonging to the *Omphalocele* or *Hernia Umbilicalis*. To which we may add, that the Diſorder is common to Subjects of all Ages, appearing not only in Infants and Children, but more frequently in Adults.

Prognoſis. IV. It may be here proper to caution the Surgeon, leſt he ſhould miſtake this Kind of Rupture for an Abſceſs in the Abdomen, and proceed raſhly to open or treat it accordingly. That ſuch a Miſtake may be eaſily made by the unſkilful, I am convinced, from an Inſtance within my own Knowledge; in which a Surgeon intended to have opened one of theſe Tumors as an Abſceſs, and have probably cut through the ſubjacent Inteſtines, as well as the Integuments of the Abdomen, if I had not better informed him and perſuaded him to the contrary. When the Diſorder is of long ſtanding in Adults, and eſpecially in old People, the Cure of this Diſorder is very difficult, as it alſo is hardly ever cured, when occaſioned by a Wound of the Abdomen, becauſe the Peritonæum is then wanting. If the Aperture of the Peritonæum be ſmall and contracted, ſo as to compreſs the prolapſed Inteſtine, the Caſe is very dangerous, as in umbilical Ruptures, being frequently attended with moſt acute Pain, Inflammation, Vomiting, and even the iliac Paſſion. And if the Inteſtines come through the *Linea Alba* above or below the Navel, the Diſeaſe is univerſally allowed to be almoſt incurable: but as the Opening of the Peritonæum is uſually larger in theſe than other Ruptures, they are on that Account generally eſteemed leſs dangerous.

Cure. V. Though this Kind of Rupture may be attended with many bad Symptoms from the Diviſion of the Peritonæum and Stricture upon the Inteſtines, if left to itſelf; yet if it be recent, and in Infants or Children, there is no doubt but it may be remedied, or at leaſt alleviated by the Aſſiſtance of Art. In this Caſe, the Girdle at *Tab.* XXIV. *Fig.* 6. will be found of the greateſt Benefit; eſpecially

cially if the Compreſs marked A, be ſufficiently large, and conſtantly retained upon the Part, ſecured with a Plaſter and proper Dreſſings. Which Inſtrument will be alſo of great Uſe to Adults, to prevent the Diſorder from growing worſe, when of long ſtanding, and incurable. We learn from CELSUS [a], that the Ancients had a Method of curing theſe Ruptures, like thoſe of the Navel (N° 7.) preceding, by Ligature: and when the Parts mortified and fell off, they untied the Lips of the Wound by Suture, and cured it as other Wounds. But I can by no Means approve of ſuch a Practice, as the Inteſtine itſelf may be tied up with the Integuments and mortified with them. The moſt rational Method will be to dilate the Peritonæum by Inciſion, return the Inteſtine, and manage the whole as in the *Omphalocele*; which has been practiſed with Succeſs by PETIT, on a Taylor, who was well within five Days after the Operation. An Example of a ventral Hernia, after the Cæſarean Section, may be ſeen in SAVIARD, *Obſ. Chirurg.* 59.

CHAP. CXVI.

Of the BUBONOCELE, *or* HERNIA INGUINALIS.

I. A *Bubonocele* is a Tumor in the Inguen formed by a Prolapſus of the Inteſtines, Omentum, or both, through the Proceſſes of the Peritonæum and Rings of the abdominal Muſcles. The Tumor is generally formed by a Prolapſion of the ſmall Inteſtines: but I have ſometimes known it from the Colon and Cœcum, eſpecially in the right Inguen. Not only Men but Women are alſo ſubject to this Diſorder, in which latter the Inteſtines have come down ſo low as to be even with the *Labia Pudendi*. Theſe Ruptures are ſometimes formed in Part by the Bladder, eſpecially in gravid Women, according to the Obſervation of RUYSCH, PETIT, and others. The Uterus itſelf has been alſo obſerved by HILDANUS and RUYSCH, to make Part of theſe Tumors. Great Care ſhould be therefore taken to diſtinguiſh theſe Ruptures from Bubos, and other Tumors, or Abſceſſes, leſt by wounding theſe Parts the Patient's Life might be endangered. Bubonocele deſcribed.

II. The *Bubonocele* may ariſe from two Cauſes like the *Exomphalos:* either from a Relaxation of the Peritonæum and Rings of the abdominal Muſcles, or from ſome violent Contraction and Preſſure of the abdominal Muſcles upon the Inteſtines, as in jumping, lifting great Weights, coughing, hallowing, blowing a Trumpet, riding on Horſeback, ſome Fall or Blow, violent Vomiting, difficult Birth, *&c.* by which Means the Peritonæum is either lacerated, or, according to the general Opinion of the Moderns [b], ſo far dilated, as to let through the In- Cauſes.

[a] *Medic. Lib.* VII. *Cap.* 17.

[b] Many, and I believe, the greateſt Part, of our Modern Surgeons (particularly HILDANUS, *Epiſt. de Hernia Uterin.* NUCK, *Exper. Chirurg. Cap. de Hern. & Adenograph.* p. 171. and RUYSCH, *Obſ.* 18. *Adverſ. Anat. Dec.* II. *aliique*) are of Opinion that the Peritonæum does not burſt, but is only dilated in theſe Ruptures. But though their Opinion is often true than the other, yet the Peritonæum is ſometimes ruptured by great Violence, as ÆGINETA obſerves, *Lib.* VII. *Cap.* 65. which is alſo confirmed by the Obſervation of ROSSETUS, BARBET, and GARENGEOT, as well as myſelf.

teſtines, Omentum, or both. Sometimes only one Side or Cell of the Inteſtine is preſſed through the Peritonæum, according to the Obſervation of LITTRIUS *in Act. Acad. Pariſ. Ann.* 1700. MORGAGNI *in Adv. anatom.* III. p. 8. and 9. and RUYSCH *in Adverſ. Anat. Dec.* II.

Symptoms. III. When this Diſorder is formed inſenſibly, and by Degrees, it is attended with but few and ſlight Symptoms, unleſs the Fæces are indurated, or a Conſtriction and Inflammation of the Ring affect the Patient. In this Caſe it uſually ariſes from taking Cold, violent Exerciſe or Straining, eating too plentifully of groſs and flatulent Food, or violent Paſſion, as I have ſometimes obſerved, which will frequently exaſperate the Diſorder, ſo as to ſtrangle the Inteſtine in the Aperture of the Peritonæum, that its Contents can have no Paſſage. The Conſequence of which will be violent Pain and Inflammation, Sickneſs, Vomiting, and the iliac Paſſion: to which Symptoms thoſe are always expoſed, who have an *Oſchiocele* or Prolapſion of the Inteſtines into the Scrotum. Therefore ſuch as have a Rupture at the Navel, Inguen, or Scrotum, ſhould be careful not to go without a proper Truſs, which would endanger them of relapſing into a worſe Kind of Diſorder from the Cauſes here mentioned. Though it muſt be confeſſed, that ſuch as are guarded with a Truſs, do ſometimes relapſe in violent Riding or other Exerciſe, in which the Truſs is either broke, looſened, or diſplaced, and the Inteſtine falls down. This formerly happened to the *French* Duke DE VILLEROI in Hunting, not without endangering his Life, as DIONIS mentions.

Diagnoſis. IV. The *Hernia Inguinalis* may be diſcovered from the Tumor thereby occaſioned in the Groin, which proceeds up to the Ring of the abdominal Muſcles: and when the Inteſtine is not incarcerated or impriſoned, but returnable into the Abdomen, the Tumor ſubſides upon lying down, and in other Poſtures. Upon preſſing it with the Hand the Tumor feels ſoft, with an equal Reſiſtance, as if one touched the Inteſtine diſtended with Wind, which frequently aſcends into the Abdomen with a murmuring Noiſe; by which it may be diſtinguiſhed from a Bubo. But when the Omentum only forms the Tumor, it has a greater Reſiſtance, and cannot be eaſily returned. When the Omentum and the Inteſtines fall together, a ſoft Swelling generally remains, though the Inteſtines are returned. When the *Hernia Inguinalis* is incarcerated, ſo that the Parts forming the Tumor are not returnable into the Abdomen, it uſually appears with a greater Reſiſtance to the Touch, Redneſs, and Inflammation, the Patient being troubled with intenſe Pain, and a Fever, followed by a violent Vomiting and the iliac Paſſion, to ſuch a Degree, that the Patient is thereby ſpent, and ſometimes periſhes in a cold Sweat, for want of timely Relief.

Prognoſis. V. Theſe Ruptures are often attended with Danger, eſpecially the incarcerated; in which, if the Inteſtine be not timely returned, but the Stricture continues two or three Days, red and livid Spots appear upon the Tumor, which denote a Sphacelus or Mortification: and if the Hiccough, and an univerſal cold Sweat ſeizes the Patient, he has generally but a few Hours to live. In this Caſe, many prudent Surgeons omit the Operation as uſeleſs, to avoid Reflexions, as being inſtrumental to the Patient's Deceaſe. But when the Diſorder is recent, the Symptoms mild, and the Patient ſtrong, the Surgeon need not be then ſo haſty to perform the Operation. When the Omentum alone falls

falls down, there is leſs Danger, than when it is accompanied with the Inteſtines: though the Symptoms of an incarcerated Bubonocele have been ſometimes obſerved, when the Omentum has been found in the Rupture, upon dividing it. When the Redneſs and Reſiſtance of the Tumor goes off, and it turns livid or black, the Patient being troubled with inceſſant Vomiting, weak Pulſe, *&c.* it is a ſure Sign that the Inteſtine is mortified alſo. When the Inflammation is communicated from the Inteſtine to the other Viſcera, and the Abdomen appears diſtended, there is then little or no Hopes left of the Patient's Recovery. Laſtly, if the prolapſed Inteſtine adheres to other Parts, ſo as to require the Operation, the Caſe is then alſo doubtful and precarious; the Operation itſelf being ſometimes impracticable, eſpecially in the crural Rupture, where it ſometimes adheres to the Artery or Vein, as GARENGEOT has obſerved. The Notion, therefore, that the ancient Phyſicians never practiſed this Operation, ſeems in my Opinion to be true, as we find no Account thereof, either in CELSUS, ÆGINETA, or others. But as the Operation may be frequently, though not always ſucceſsful, I think no Time ſhould be loſt before it is put in Execution.

VI. When the Inteſtine is returnable, the Patient ſhould be laid on his Back, and his Thigh a little bent to relax the Integuments. Then the Tumor is to be gently preſſed or returned with the Hands and Fingers: after which a Plaſter and Compreſs are to be applied to the affected Part, retained with a proper Truſs or Bolſter, and Girdle or Bandage, ſeveral of which are exhibited in *Tab.* XXV. By keeping the Parts preſſed cloſe together in this Manner, without taking off the Truſs for ſeveral Months, a perfect Cure is frequently obtained, eſpecially if the Diſorder was recent, and in an Infant or Child: and even in Adults, the ruptured Parts become ſo contracted, as not to admit a falling down of the Inteſtine, if they are not perfectly cloſed. And this Practice hardly ever fails of Succeſs in any that are under twenty Years of Age: ſo that there is no occaſion to ſubject the Patient to the Torture of dividing the Parts by Inciſion, when this milder Method will equally or better ſucceed. But Patients who are advanced in Years, ſhould never leave off the Truſs, nor perform any violent Exerciſe, if they are deſirous to prevent a Return of the Diſorder.

Method of Cure when the Inteſtine is returnable.

VII. But in ſome Patients theſe Ruptures cannot be retained by the Truſſes and Bandage; or they will not ſubmit to the Trouble of continuing them, perhaps to no Purpoſe. Here the Cure may be effected by a proper and prudent Inciſion; by which the Skin is ſeparated from the Saccus Herniæ, and faſtened to the Ring of the external oblique Muſcle, after the prolapſed Parts have been returned: and that without Damage to the Teſticles, or the Spermatic Veſſels. But of this more at large, when we treat of the Cure of the Heria Scroti. *Ch.* CXIX. *Sect.* 12.

VIII. There are ſome Caſes, where the Rupture is not of the incarcerated, and the Ring of the Abdomen is wide enough, yet it cannot be returned, becauſe both Inteſtines and Omentum adhere to the Saccus Herniæ. Here Truſſes and Girdles can be of no Service; on the contrary, they would ſo compreſs the prolapſed Parts, as to cauſe Inflammations and other dangerous Symptoms; neither ſhould I in ſuch Caſes adviſe an Inciſion: for we know not whether the Inteſtines may with Safety be ſeparated from the cohering Parts. I would therefore recommend to theſe Patients Bandages only, juſt to ſupport the Hernia

that its Weight be not troubleſome, and, in ſome meaſure, prevent an Increaſe of the Rupture.

CHAP. CXVII.

Of the Hernia Inguinalis incarcerata, or intercepted BUBONOCELE.

Method of Cure when the Parts are not returnable.

I. WHEN the prolapſed Parts in the Rupture are ſo incarcerated or intercepted, that they cannot be returned into the Abdomen by the Hand of the Surgeon, whether it be from the Inteſtines coming through the Rings of the abdominal Muſcles, or from a Stricture in the Sacculus of the Peritonæum, the Surgeon muſt then proceed to the Operation of dilating the Parts by Inciſion as before in the Omphalocele. But he may firſt try to reſtore the Parts by more gentle Means, as the repeated Uſe of Cataplaſms, Ointments, and laxative Clyſters, after bleeding, whereby the Stricture is ſometimes removed, the Parts relaxed, and the Inteſtines may be returned by the Fingers without muſt Difficulty. In order to which, the Patient having made Water, is to be laid on his Back with his Head inclining, his Hips elevated, and his Thigh a little bent inward: the Inteſtines are then to be gently preſſed in a circular Direction towards the *Os Ilium*, from whence they proceeded, and being returned, the fiſſured Parts of the Abdomen are to be compreſſed by the Hand of an Aſſiſtant, till the Dreſſings are applied. You muſt dreſs with a Plaſter, and thick Compreſs of a triangular Figure, firmly ſecured upon the Part by a leather Girdle, or the Bandage called *Spica Inguinalis*, which ſhould not be left off by the Patient for many Years; and if he be old, it ſhould be wore during Life. I have ſometimes known a Clyſter of the Smoak of Tobacco ſucceed in relaxing the Parts, when others have failed; the Inſtrument for adminiſtering which we ſhall deſcribe in treating of Operations belonging to the Anus. This laſt kind of Clyſter particularly ſucceeded, when others were of no Effect, in a Man, who had laboured under an incarcerated Bubonocele, with all its malignant Symptoms, for the Space of three Days, when the Patient was ſuppoſed by every one to be near dying: I have ſince returned many other Ruptures by the ſame Practice; ſo that I have never yet had Occaſion for the Knife in this Diſorder [a]. Some recommend the Application of Cloths dipt in cold Water, which, if the Diſorder be recent, may ſometimes ſucceed: but in ſome Caſes may be dangerous, as promoting a Sphacelus [b].

Cure by Inciſion.

II. When the Surgeon perceives that it is impoſſible to return the Inteſtine, and finds by the great Inflammation, Pain, and Vomiting, that the Diſorder will be fatal, he ſhould acquaint the Patient and his Friends with the great Neceſſity there is for him to undergo the Operation, to prevent a Morti-

[a] A large *Clyſma fumoſum* of the common *Engliſh* or weak Tobacco, was injected into a poor Patient under this Diſorder, but with no Effect. But the Smoak of ſtrong *Virginia* Tobacco quickly gave the Patient a Stool, and the prolapſed Inteſtines ſoon returned into the Abdomen of themſelves.

[b] Some of our modern Surgeons rely greatly on the Exhibition of *Cort. Peruv.* in a Mortification of the Inteſtine. *Vide Commerc. litt. Norimb. Ann.* 1735. Pag. 3.

fication

fication and conſequent Death. When the Patient has ſubmitted to the Operation, having diſcharged his Urine, he is to be laid on his Back upon a Table, or on the Side of his Bed: the Inguen ſhould be alſo ſhaved, that he may meet with no Obſtruction. The Patient's Head ſhould be then inclined, his Hips elevated, and Thigh a little inflected, being ſecured or held firm by an Aſſiſtant. The Integuments are next to be taken up on each Side the Tumor by one Hand of the Surgeon and another of the Aſſiſtant, while he makes a longitudinal Inciſion with a Scalpel upon the Middle of the Tumor; after which he is to dilate or remove the Sides of the Wound from each other. But if the Integuments cannot be thus elevated by reaſon of the violent Inflammation, the Surgeon ſhould then graſp the Tumor between the Thumb and Fore-finger of his left Hand, making the Inciſion downward, in a right Line, and with a light Hand, that he may not divide deeper than the Skin, ſo as to injure the Inteſtine. A Director is then to be introduced between the Tumor and divided Skin, and the Wound is to be enlarged upward and downward by an Inciſion Knife or Sciſſars; after which the Sides of the Wound are to be drawn aſunder by Hooks or the Fingers, and the remaining Part of the *Membrana Adipoſa* carefully divided, till the Inteſtine or its Sacculus, the Peritonæum, appear in view. GARENGEOT tells us, that the modern *French* Surgeons divide the Membrana Adipoſa not perpendicularly with an obtuſe Inſtrument, but obliquely with a Scalpel, till the Sacculus of the Rupture appears: but this ſhould be done with great Circumſpection, for fear of wounding the Inteſtines. The divided Integuments ſhould be alſo elevated by the Thumb and Finger of the left Hand; and to avoid the Inteſtine, a ſmall Opening might be made in the Peritonæum with the Point of the Scalpel, to introduce the Finger. If the Surgeon ſhould meet with a Quantity of Water or Lymph, diſcharging itſelf by the ſmall Aperture in that Membrane, he ſhould not be ſurprized, being no more than uſual; but ſhould proceed to divide that Integument upward with a Pair of Sciſſars, or the Scalpel, *Tab.* V. *Fig.* 3, 4, or 5. (which GARENGEOT prefers to all other Inſtruments in this Caſe) till he comes to the Rings of the Abdomen. And if any large Blood Veſſel ſhould be by Accident divided, which would obſcure the Work, it ſhould either be taken up with a Needle and Thread, or compreſſed by the Fingers of an Aſſiſtant, who ſhould alſo dry up the Blood with Lint or a Sponge. If the Inteſtine then appears to be ſound, it is to be returned by a gentle Preſſure through the Ring of the abdominal Muſcles. But as the Inteſtine is often wrapped in the Omentum as in a Sacculus, that muſt be incided quite to the Ring; and the Inteſtine replaced by the Fingers, if poſſible, without cutting the Ring. But if any Flatus or contained Fæces prevent its return, they ſhould be firſt gradually preſſed out: and if that alſo proves inſufficient, the Ring of the abdominal Muſcles itſelf ſhould be divided, but inward or towards the Linea Alba, to avoid the epigaſtric [a] Artery, which runs outward. If the prolapſed Parts ſhould have any Adheſions, they ſhould be carefully ſeparated. The Ring of the abdominal

[a] A large Hæmorrhage will probably enſue on cutting this Artery. But if you apply Lint to it, ſteeped in ſome ſtyptic Liquor, and compreſs the Artery towards the *Os Ilium*, the Blood will eaſily be ſtaunched with the Aſſiſtance of the ſubſequent Dreſſings. LE DRAN maintains that the Epigaſtric Artery is not eaſily injured in this Operation. *Op. Chirurg. de* HERN. And I am of the ſame Opinion.

Muſcles may be divided, either with a Scalpel; or, to avoid the Inteſtines, with the Director, *Tab.* XXIV. *Fig.* 8. or with the Inſtrument of Mr. MORAND, *Fig.* 9. or of LE DRAN, *Fig.* 10. and for the ſame Purpoſe, the concealed Scalpel, *Tab.* XXV. *Fig.* 1, 2. has been a long Time in Eſteem. But as this Inſtrument may injure the Inteſtine by its Point, which is elevated, the fore-mentioned are uſually preferred to it: in uſing either of which the Inteſtines ſhould be preſſed down from the Inſtrument by an Aſſiſtant, which is the Uſe of the two Plates AA, in PETIT's Director, *Tab.* XXIV. *Fig.* 8. and of the Plate HI in LE DRAN's Inſtrument, *Fig.* 10. When the ruptured Part has been dilated, and the Inteſtine returned, the Wound is to be dreſſed with linen Compreſſes of a triangular Figure, and retained by the Bandage called *Spica:* though ſome ſcarify the Ring of the Abdomen, to make a firmer Cicatrix, and prevent a Return of the Diſorder. But of this more at large, in N° 9.

Other Methods of Cure uſed by ARNEAU and PETIT.

III. Though the Patient may be happily remedied by the Means already propoſed, it may not be amiſs to acquaint our Reader with the Practice of two conſiderable Surgeons at *Paris* in the ſame Diſorder. ARNEAU, having divided the Integuments with a Pair of Sciſſars, in the Director, *Tab.* I. MN, then dilates the Lips of the Wound with his Fingers, and gently ſeparates them from the ſubjacent Tumor: which Tumor he takes up between the Thumb and Fore-finger of his left Hand, and divides the Membranes, which cover the Sacculus of the Inteſtine, one after another, with a crooked Scalpel. If any ſmall Veins occur, they are tied up in two Places, and then divided, that his Work may not be obſcured by their bleeding. But if any Blood ſhould iſſue from the Wound, it muſt be cleanſed with a Sponge or Lint. Any Part of the Integuments, which adheres to the Sacculus, he ſeparates with his Fingers, or with a Director, and Probe Sciſſars. This being rightly performed, he elevates the upper Part of the Sacculus by his Fore-finger and Thumb, and ſeparates it from all Adheſions, leaving it entire. PETIT inſerts a Director, with an Inciſion Knife, under the Ring of the Abdomen, and makes an Opening in the Manner we have before deſcribed: after which, he returns the Inteſtine gently towards the *Os Ilium.* To prevent a Return of the Diſorder, he applies a Bolſter or Pellet of compact Lint, dipt in the white of an Egg, ſhook together with Spirit of Wine, and being expreſſed, is convoluted in the Hand, before he applies it, in the Form of an Egg. Over that he applies another, which is ſecured upon the Part by three or four triangular Compreſſes, each a little larger than the other, moiſtened with *Sp. Vini*, and firmly ſecured by the Bandage called *Spica Inguinalis.*

Our Opinion of this Method.

IV. But the preceding Method of Cure, without opening the Sacculus, is not approved of by me nor many other eminent Surgeons: 1ſt, becauſe the Sacculus ſometimes adheres to the ſpermatic Veſſels, from whence it cannot be ſeparated without injuring them. 2dly, Becauſe the prolapſed Omentum or Inteſtine is frequently ſuppurated, which can be neither cured nor diſcovered while the Sacculus is entire: for if the Inteſtine be corrupted ever ſo little; if but a black Spot appear in it; or if any ways wounded, it cannot be replaced with Safety. If a large piece of the Inteſtine be vitiated, it muſt be cut off; and the Extremities of the ſound Parts afterwards cloſed by a Suture of the Meſentery. 3dly, Becauſe the Sacculus ſometimes contains a large Quantity of fetid and ichorous

Matter, which would be this Way returned in the Abdomen, to the great Injury of the Patient. And CHESELDEN obſerves in his Anotomy, *Edit.* 3. *Pag.* 283. that he has found above two Pound of fetid Matter in the Sacculus of a Rupture of this Kind; which, according to the preceding Method, would have been doubtleſs returned into the Abdomen. 4thly, The Inteſtines or Omentum ſometimes adhere to the external Parts, from which they cannot be ſeparated without opening the Sacculus. 5thly, The Sacculus being left entire, may eaſily occaſion a Return of the Diſorder. 6thly, And laſtly, this Method cannot ſucceed in thoſe inguinal Ruptures, where the Peritonæum is lacerated. LE DRAN alſo diſapproves of this Method, becauſe he does not find it to be attended with any particular Advantages, and becauſe in incarcerated Ruptures of ſome Days Continuance, the Inteſtine may be ſphacelated and ignorantly returned in that State; by which Means the Chyle and Fæces would run into the Abdomen, and poſſibly kill the Patient. He therefore concludes, that the Sacculus ſhould be always opened when the Rupture is incarcerated.

CYPRIANUS's Method of Cure.

V. D. CYPRIANUS (who was formerly an eminent Phyſician and Surgeon in *Holland*, but ſpent the latter Part of his Life in *England*) uſed to open the Sacculus of the Peritonæum in this Diſorder, as we before adviſed; with this Difference, that inſtead of a Director he inſerted his Finger to guide and defend the Knife in dilating the Wound. When the Ring of the abdominal Muſcles was not wide enough to return the Inteſtine, he inſerted a Director, and divided the Skin, Fat, Muſcles, and Peritonæum, to dilate the Ring. He then inſerted his Finger, and upon that a Pair of Probe Sciſſars, with which he divided them all, till there was an Opening made large enough to return the Inteſtine, without any Force: which he approved of, becauſe by preſſing the Inteſtine through a narrow Stricture, it frequently inflames and mortifies. If the Inteſtines adhered to any of the external Parts, he firſt carefully ſeparated them with the Scalpel, and cloſed the Wound by the *Sutura Nodoſa*, as in *Gaſtroraphia*; which Suture is recommended not only by CELSUS but alſo ROSSETUS, and above a hundred years ago by ROLFINCIUS.

CHESELDEN's Methods of Cure.

VI. CHESELDEN's Method for incarcerated Ruptures of the Inteſtines or Omentum, is to divide the Integuments, abdominal Muſcles, and Peritonæum, by a longitudinal Inciſion, ſufficiently large, and extended into the Aperture, through which they were prolapſed. Then introducing his Fingers into the Wound, he draws in the Inteſtine; and if any Part of the Omentum adheres, he paſſes a Needle and double Thread round it, and after tying, amputates it: and thus he has happily reſtored the Patient. But whether he cloſes up the Wound by Suture, or any other Method, he does not inform us: yet he has been ſo particular, as to repreſent the Caſe with a Figure. It were to be wiſhed, for the Public good, he had been ſome what more explicit in his Deſcription of this Operation: tho' he ſeems in this Practice to have copied after SMALZ, a famous Surgeon: who, as DECKER informs, followed this Method, which he likewiſe illuſtrated with an elegant Figure.

What is to be done after reducing the Rupture.

VII. When the Inteſtine has been returned into the Abdomen, different Methods of Dreſſings are uſed agreeable to the different Circumſtances of the Caſe. And here a Pellet of Lint may very properly by applied to the Ring, as at N° 3; the Remainder of the Wound filled with looſe Lint, covered with a Compreſs, and the Bandage, called *Spica*, not over tight. It is the Practice of ſome Surgeons

geons to ſcarify, or make many ſmall Inciſions with the Scalpel or Sciſſars in the upper Part of the abdominal Ring, in order to render the Cicatrix more firm, and prevent a Relapſe of the Diſorder. But if this be put in Practice, it ſhould be done with great Caution, to avoid wounding the Inteſtine. The looſe Part of the Sacculus is then tied up with a Ligature near the Ring of the abdominal Muſcles, and afterwards cut off below the Ligature, together with ſo much of the Integuments as are ſuperfluous. The Wound is to be dreſſed with Pledgits of Lint, and particularly the Pellet of PETIT before-mentioned, to be retained with thick triangular Compreſſes and the Bandage *Spica:* then bleeding the Patient after the Dreſſing, when of a full Habit, he may be inclined to reſt. During the whole Courſe of the Cure, the Patient ſhould lie ſtill, with his Head not much elevated: and his Diet ſhould be ſpare and eaſy of Digeſtion, as we have recommended in other Wounds. If the Patient ſhould be looſe naturally, laxative Medicines may be uſed internally: an emollient Clyſter ſhould be injected daily. And if the Patient ſurvive the Space of four or five Days after the Operation, we may reaſonably ſuppoſe him to be out of Danger. If the Inteſtine is ſphacelated, or the Omentum corrupted, or both of them hang out of the Abdomen, you ſhould not apply the Lint Pellet, which would preſs too much upon the Parts and hinder their cleanſing. In this Caſe the Dreſſing ſhould be only dry Lint, a Compreſs and Bandage. If the Inflammation continues in the Inteſtine, you muſt have recourſe to Bleeding, cooling Clyſters, the Bark, and proper Fomentations. In Caſe of Vomiting, Hiccoughs, and a violent Fever, which threaten inſtant Death, the moſt powerful Medicines muſt be immediately applied, which we have preſcribed before on theſe Occaſions.

What is to be obſerved in the after Dreſſings.

VIII. After the firſt Dreſſing, the Parts ſhould not be undone without urgent Neceſſity before two or three Days: after which time the Wound may be cleanſed of its Sordes with warm Wine or Spirit of Wine, and the Remainder of the Cure performed, as we have directed in other Wounds. But care ſhould be taken at every dreſſing to let an Aſſiſtant compreſs the upper Part of the Wound, to prevent a Relapſe of the Inteſtine. And when the Wound is healed, if the Patient be young, he ſhould wear a proper Truſs for a Year or two: but if an Adult, or old Perſon, the Truſs ſhould be wore during Life.

Concerning the Uſe of Tents after the Operation.

IX. Many of the moſt conſiderable Surgeons at *Paris*, and others, adviſe the Uſe of a large Tent, after the Operation and Reduction of the Inteſtine: which being made of Lint, of a conſiderable Length and Thickneſs, and faſtened to a Thread, is to be inſerted into the Abdomen, to keep open a Paſſage for the Vent of ſuch Humours, as are formed in the Cure. WIDENMANNUS and DIONIS direct the Tent to be made about the Length and Thickneſs of a Finger; and tell us, that it ought not to be extracted, till it falls off of itſelf by a Suppuration of the Parts. But PETIT condemns the Uſe of them, as pernicious, by irritating the Parts, and admitting the external Air. Yet I cannot but acquieſce in the Uſe of them being proper, when there is a repeated Diſcharge of putrid Humours to be made from the Abdomen, as LE DRAN alſo thinks: otherwiſe, it may be ſufficient, according to PETIT, to apply a thick Pellet only, for the more ſpeedy Agglutination of the Wound.

What is to be done when the

X. If the Omentum appears to be ſuppurated or enlarged, ſo that it cannot be rightly replaced in the Operation, a Needle and double Thread is to be paſſed

paſſed round the ſound Part, and tied on each Side, and the vitiated Part afterwards to be amputated. The ſound is to be returned, and the reſt of the Treatment to be made according to the Directions we have given in treating of Wounds of the Abdomen, with a Suppuration of the Omentum. But if the prolapſed Inteſtine itſelf be found mortified or ſuppurated, as ſometimes happens, when the Operation has been too long delayed, the Patient is then in the utmoſt Danger, but ſhould not be deſerted by the Surgeon, as being incapable of any Aſſiſtance. He ſhould rather cut off the mortified from the ſound Part of the Inteſtine, and ſtitch the latter to the Margin of the Wound in the Abdomen, as we before adviſed in *Part* I. *Book* I. *Chap.* VII. by which Means many have been known to ſurvive the Diſorder, and regain their former Health. We are encouraged in this Practice, not only by the Experience of ourſelves, and others, ſupported by the Teſtimonies mentioned in the Place now quoted; but we are alſo told by MERIUS, that a Man was happily cured, who had four or five Foot of his Inteſtine cut off, which was mortified in this kind of Rupture, and the ſound Part joined to the Lips of the Wound in the abdominal Muſcles. GARENGEOT alſo mentions a Man, whoſe Inteſtine being mortified and returned by the Surgeon, in that Condition, into the Abdomen. He had ſoon after a Diſcharge of his Excrement by the Wound: and a Month afterwards the Flux by the Wound not only leſſened, but the Lips of the Wound itſelf being ſtopped with a Pellet, and tied with a Thread, gradually healed in ſuch a Manner that by untying the ſame when there was Occaſion, the Man ſurvived, and had the natural Function of the Parts performed as uſual, with but little more Trouble.

Inteſtine or Omentum is ſuppurated.

XI. LE DRAN obſerves, that it is a common Calamity among poor People, who have had the Misfortune of an incarcerated Rupture, to miſtake it for an Abſceſs, and to treat it accordingly, without calling in the Aſſiſtance of any Phyſician or Surgeon. By which Means they bring the Part to Suppuration, after intolerable Pains; and upon its diſcharging Fæces or Worms, which I have ſometimes obſerved, then they implore the Help of the Surgeon. Theſe, he ſays, generally require nothing more than the Ulcer to be cleanſed daily, and treated with ſome vulnerary Medicine, covered with a Plaſter of the ſame Kind: by which Means many ſuch Patients have been recovered, more by Nature than Art, the Wound healing up; or, in ſome, leaving an Aperture in the Groin, through which the Fæces are diſcharged, and ſometimes Worms, as it were by a new Anus. In Imitation of Nature, therefore LE DRAN (*Obſ.* 60.) does not return the ſuppurated Inteſtine into the Abdomen; nor does he amputate it; but only dilates the narrow Wound of the Abdomen, that the Blood, Sordes, and ſuppurated Parts of the Inteſtine may have a free Diſcharge; and thus he waits a ſpontaneous Agglutination of the Inteſtine with the Ring of the Abdomen. But if the Surgeon ſhould have injured the ſound Inteſtine in the Operation, he then thinks it neceſſary to ſtitch the Inteſtine to the Lips of the Wound, which inflaming, with more intimately unite with each other.

LE DRAN's Method, when the Inteſtine is mortified.

XII. That the Parts will thus agglutinate or join together, is confirmed by a late Obſervation of RAMDOHRIUS, preſent Surgeon to his ſerene Highneſs the Duke of *Brunſwick*. He ſome Years ago cut off a large Part of a mortified Inteſtine in a Woman, that had an incarcerated Rupture, which broke of itſelf; and joining the two ſound Parts of the Inteſtine together, he inſerted one into

A remarkable Obſervation of RAMDOHRIUS.

into the other, and tied them together loosely with a String; and replacing them in the Abdomen, drawed them by the String to the Mouth of the Wound; by which Means the divided Intestine inflamed, and surprizingly united. The Woman discharging her Fæces afterwards, not through the Wound, but by the Anus, as before. The Woman afterwards lived in a State of Health; till in about a Year's Time she died of a Pleurisy. Upon opening her, the divided Intestines appeared to be united with each other; of which he made a present to me, together with Part of the Abdomen, to which they adhered. I now keep them in Spirits, to convince such as are incredulous, and of a different Opinion.

What should be done in the Oschiocele incarcerata.

XIII. If the Intestine should be prolapsed into the Scrotum, and so contorted or intercepted, that it cannot be reduced or returned into the Abdomen; the Surgeon will be then also obliged to make use of the Operation in the Manner we have before related, and as we shall hereafter more fully explain. The Reader may be furnished with more useful Observations upon this Subject, in SAVIARD, *Obs. Chir.* 19. and 20. COURTIAL, *Obs. Pag.* 150. also in LE DRAN, *Obs. Chir.* and three other Dissertations or Descriptions of Cases in *Commerc. Litterar. Norimb. Ann.* 1735. *Pag.* 3. by WERLHOF, Physician to the King of *Great Britain*, which are very learned, and worthy of the Reader's Perusal.

CHAP. CXVIII.

Of the Hernia femoralis, or crural RUPTURE.

Crural Ruptures described.

I. RElated in Appearance to the Hernia Inguinalis is the *crural* Rupture, observed, and so named by our modern Physicians. I rather call it *Femoral*, as it is formed by a Prolapsion of the Intestine beneath the Integuments of the anterior or interior Part of the Thigh near the Groin, where the crural Artery and Vein pass out of the Abdomen. Though this Disorder is not unfrequently met with, especially in the weaker Sex; it is a little surprizing, that it should have been considered by so few, and with so little Accuracy, insomuch that many have made no Distinction between this and the Hernia Inguinalis. VERHEYEN is the first that has wrote of this kind of Rupture; though BARBETT seems to have hinted at it obscurely before him. After VERHEYEN, the Disorder was explained more at large by PALFYN, and after by GARENGEOT and Dr. FRIEND, COCHIUS and LE DRAN. Indeed GARENGEOT tells us, that the Disorder was known to the Ancients, and particulary PAULUS, but without mentioning the Place where: and for my own Part, I can find nothing upon the Subject in that Author. And the Words, which he attributes to BARBETT in the same Place, I cannot find in any Part of that Author's Chapter upon Ruptures.

Nature of the Disorder.

II. The Seat of this kind of Rupture is agreed on by Anatomists to be in a small Cavity of the Thigh, between the iliacus and psoas Muscles under the Sartorius, where the crural Artery and Vein pass from the Abdomen into the Thigh: in which Part the Peritonæun may be easily distended, being very loosely guarded before by the Tendons of the abdominal Muscles, and secured

at

at bottom by nothing but a little Fat, and the cellular Membrane, which may be more eaſily dilated than the Rings of the Abdomen, as it is ſubject to a perpendicular Preſſure in our erect Poſture. If we examine the *Os Ilium* in a Skeleton, we find a ſmall circular Excavation in its anterior Part above the *Acetabulum*; over which is extended the lower Part of the Tendon of the oblique deſcending Muſcle, ike a String over the Arch of a Bow, which, being intermixed with ſome tough ligamentary Fibres, forms what Anatomiſts call the *Ligamentum Veſalii* or *Poupartii*. This is the ſmall Arch or Cavity, through which the Inteſtines, and ſometimes the Omentum are prolapſed in the crural Rupture. GARENGEOT ſays, this Rupture occurs more frequently than any other: but though I have ſeen and cured a great Number of all Kinds, I never met with above one or two of the crural Species.

III. Though there is a near Reſemblance between the inguinal and crural Rupture; yet if the Surgeon accurately obſerves the Parts occupied by each, he will, without much Difficulty, perceived their manifeſt Difference. For the inguinal Rupture is ſeated nearer the *Regio Pubis*, in that Part where the Proceſſes of the Peritonæum paſs through the Rings of the Abdomen, and accompany the ſpermatic Veſſels into the *Scrotum*; the Tumor extending itſelf from the Ring down to the *Scrotum*. Whereas the crural Rupture is ſeated more to the Outſide of the *Inguen*, in the upper and anterior Part of the Thigh above the *Acetabulum:* the Crural is alſo uſually ſmaller, rounder, and deeper, than the Inguinal, which is more oval or oblong. Laſtly, as this Diſorder has not yet gained a Name in *Germany*, it may be not improperly ranked under the *Hernia Inguinalis*; which may be reckoned of two Kinds, *interior* and *exterior*, the latter being the crural Rupture. Diagnoſis.

IV. The Conſequences and Treatment of the crural Rupture may be in a great Meaſure underſtood, from what we have before ſaid concerning the *Hernia Inguinalis*, though Patients afflicted with the crural Rupture are ſometimes in more Danger than in the other, from the Narrowneſs of the Aperture. It is to be alſo obſerved, that to reduce the prolapſed Inteſtine of the crural Rupture, it ſhould be preſſed more towards the *Linea Alba* inward, and not towards the *Os Ilium* outward, as in the *Hernia Inguinalis*. If the Inteſtine can be returned with the Hand in the crural Rupture, it may be ſufficient only to apply a Plaſter, Compreſs, and Bandage, as in the *Hernia Inguinalis*. Prognoſis and Cure.

V. But when the Inteſtine is incarcerated or intercepted, in ſuch a manner, that it can receive no Benefit from the Uſe of Oils, Ointments, Cataplaſms, and Clyſters, eſpecially that of the Smoak of Tobacco; it will be neceſſary to proceed to the Operation, as we direct in the Bubonocele. The Sacculus of the Peritonæum being laid bare, the Foramen, through which the Inteſtine prolapſed, ſhould be a little dilated, but ſo as not to injure the Sacculus, if the Diſorder be recent, as PETIT adviſes. Then the Inteſtine or Omentum is to be gently protruded into the Abdomen, which may be uſually done without much Difficulty, as it is generally but a ſmall Part, or an *Appendicula* of the Inteſtine, that forms the Tumor, as VERHEYEN rightly obſerves in his Anatomy, *Cap.* DE PERITONÆO. When the Rupture is reduced, the Wound made in the Operation is to be healed like that in the Bubonocele.

VI. But if a large Part of the Inteſtine falls down, and adheres to ſome of the adjacent Parts, ſo that it cannot be returned without dividing the Sacculus; or when the Inteſtine may be reaſonably ſuppoſed to be ſuppurated from a long Neglect of the Diſorder; the Sacculus of the Peritonæum ſhould then be carefully inciſed, the Inteſtine freed and returned when ſound, as we directed in the preceding Chapter. But great Caution ſhould be uſed not to injure the ſubjacent crural Artery or Vein, which might inſtantly endanger the Patient's Life. And laſtly, if the Omentum is prolapſed in this Rupture, and it or the Inteſtine vitiated, the unſound Parts may be amputated, and the reſt treated as in the preceding Chapter.

CHAP. CXIX.

Of the Oſcheocele, or Hernia of the Scrotum, and particularly of the ENTEROCELE, *or Prolapſus of the Inteſtine into the Scrotum.*

Deſcription and Kinds of the Oſcheocele.

I. WE have hitherto deſcribed thoſe Ruptures, which happen in the ſuperior Part of the Abdomen. We now proceed to thoſe, which ariſe from the ſame Cauſes in the Scrotum. A Rupture in this Part is generally termed by Phyſicians and Surgeons an Oſcheocele, or Hernia Scrotalis: of which there are two Kinds; the true, from a Prolapſion of the Inteſtine or Omentum; and the ſpurious, or only apparent, from a Tumor of the Teſticles or ſpermatic Veſſels, or a Diſtention with Air, Water, or ſome offending Humour. The Oſcheocele is therefore diſtinguiſhed into various Kinds, according to the different Subſtance, with which the Scrotum is diſtended, by which it is alſo differently denominated. When the Inteſtine is prolapſed, through the Proceſs of the Peritonæum into the Scrotum, the Tumor is then called Enterocele; if from the Omentum, Epiplocele; if from a Diſtention with Water, Hydrocele; from Wind or Flatus, Pneumatocele; when from Blood, Hæmatocele; from Fat, Liparocele. If the Teſticle is enlarged beyond its proper Dimenſions, it is termed Sarcocele; and when the ſpermatic Veins are too much diſtended, it is termed Varicocele, Circocele, or Hernia Varicoſa. When an Abſceſs is formed in the Scrotum, it is by ſome termed *Hernia Humoralis*. Sometimes two or more of theſe Subſtances concur together to form the Tumor, which is then named conjunctly from them, Entero-epiplocele, or Hydro enterocele, *&c.* Sometimes a Hydrocele is in one Side of the Scrotum, while an Enterocele occupies the other, as I lately obſerved: and ſo of the reſt.

Of the ENTEROCELE.

Enterocele deſcribed.

II. An Enterocele is defined by Phyſicians, to be a Tumor formed by a Prolapſion of the Inteſtines through the Rings of the Abdomen and Proceſſes of the Peritonæum into the Scrotum. See *Tab.* XXV. *Fig.* 3. AB. It is ſometimes termed an *Oſcheocele*, and compleat Hernia, in Contradiſtinction to the *Bubonocele*, which is an imperfect Hernia, the Inteſtine not extending into the Scrotum. The Diſorder always ariſes from a violent Diſtention of the Peritonæum

næum and Rings of the abdominal Muſcles, through which the Inteſtine prolapſes into the Scrotum (ſee *Tab.* XXV. *Fig.* 4. D) the Peritonæum being dilated into a Sacculus, including the Inteſtine oftner than ruptured, ſo as to let the Inteſtine thro' into the Scrotum. But the Peritonæum is ſometimes Ruptured, as ÆGINETA obſerves, *Lib.* VI. *Cap.* 65. This Rupture is always attended with Pains, and uſually happens but of one Side, never in both at a Time. Sometimes only the Inteſtines fall down; at other Times it is accompanied with the Omentum.

Cauſes and Signs of the Enterocele.

III. This kind of Rupture, like the Exomphalos and Bubonocele, uſually proceeds from ſome Violence, by a Fall, Blow, or ſtraining to Leap, lifting great Weights, Vomiting, *&c.* and according to the Nature of the Cauſe the Rupture is formed, either inſtantly, or imperceptibly by Degrees. The Tumor appears ſoft to the Touch, like an Inteſtine or Bladder diſtended with Wind: It firſt appears ſmall in the Inguen, and gradually deſcends down to the Teſticle of the ſame Side in the Scrotum, which is thereby ſometimes diſtended half way down the Thigh, or even to the Knee. The other Symptoms of this Rupture are the ſame with thoſe of the Bubonocele before deſcribed: A ſoft Tumor appears extended from the Ring of the abdominal Muſcles down to the Scrotum, near the Teſticle, from which it may generally be diſtinguiſhed by the Touch. When the Diſorder is but ſlight and without Inflammation, it is ſometimes diminiſhed or augmented at Intervals; eſpecially when the Patient lies down, the Inteſtine returns into the Abdomen of itſelf, or with a gentle Preſſure of the Hand, making a Sort of murmuring Noiſe: but upon the Patient's ariſing, or removing the Hand, it again returns with the like Noiſe. The Tumor is alſo increaſed by crying, plentiful eating, and lifting or carrying Burthens: it is likewiſe contracted with Cold, and dilated with Heat. Sometimes the prolapſed Inteſtine is inflamed, greatly diſtended with Fæces, or adheres to the adjacent Parts; by which Means it is rendered incapable of returning into the Abdomen. The Enterocele may generally be diſtinguiſhed from the Hydrocele or Pneumatocele, by its returning into the Abdomen with a murmuring Noiſe. The Patient is ſometimes troubled with cholicky Pains, more or leſs violent in the Abdomen, Inguen, and Scrotum, with a Nauſea and Vomiting, eſpecially in the *Oſcheocele incarcerata*. When this Rupture comes on violently and on a ſudden, the Ring of the Abdominal Muſcles is generally ſo contracted, that the Inteſtines cannot be returned through it: in this Caſe it almoſt always degenerates into the incarcerated Hernia.

Prognoſis.

IV. This kind of Rupture may be ſuſtained with but little Inconvenience, by Men not much addicted to hard Labour, and Women with Child; but it ſhould never be left to itſelf, without a Support or Truſs, leſt by ſome Accident the Inteſtines ſhould become incarcerated, and incapable of being returned. And indeed, without theſe Aſſiſtances, there is great Danger: for from Falls, Blows, coughing, ſneezing, lifting great Weights, vomiting, *&c.* the Inteſtines are often forced down further, and produce the Hernia incarcerata, with all its terrible Symptoms, terminating at laſt in Death itſelf; as deſcribed in the Chapter *de Omphacele & Bubonocele.* When the Diſorder is recent, and in a young Subject, it may be perfectly cured without Danger of a Relapſe: as it may alſo in Adults, and old People, by conſtantly wearing a proper Truſs.

It is to be alſo obſerved, that there is leſs Danger in thoſe Ruptures, where the Inteſtine is accompanied with the Omentum, than in ſuch as have a Prolapſion of the Inteſtine without the Omentum.

Method of Cure in the Enterocele.

V. When the Rupture is not yet become incarcerated, but the Inteſtine is returnable without any Adheſions, the Surgeon ſhould immediately proceed to reduce the Parts, and retain them in their proper Situation, and to cloſe up the Aperture firmly with a Truſs, Bandage; or attempt the Cure by Inciſion, termed Celotomia. The Method which ſome boaſt of, and pronounce effectual, of treating theſe Ruptures with Ointments and Plaſters, and other Medicines without the Uſe of a Truſs, is to me vain and frivolous, at leaſt very uncertain. The main of the Cure therefore, in a recent Enterocele, depends upon the Application of a proper Bandage, as we have deſcribed in the Bubonocele *Chap*, CXVI. N° 6. *Tab.* XXV.) which, with the Aſſiſtance of proper Internals, Externals, and Diet, ſeldom fails to ſucceed in Adults, as well as in Infants and Children[a].

Of Caſtration in the Enterocele.

VI. I cannot help condemning in this Place the baſe and common Practice of ſome Medicaſters, who having tied up the ſpermatic Veſſels and Proceſs of the Peritonæum, caſtrate the Patient in this Diſorder without any Manner of Neceſſity, and thereby torture the Patient, and endanger his Life. Such pernicious Practices ought to be corrected with Severity by the Civil Magiſtrate, eſpecially as it is not a Preſervative againſt a Relapſe of the Diſorder, which is confirmed not only by my own Experience, but alſo the Authority of CELSUS and CYPRIANUS. This kind of Ruture ſhould therefore be reduced, and the Parts ſecured with a Truſs, without tormenting the Patient with Inciſion or Caſtration. More may be ſeen upon this Subject in our Diſſertation, upon removing the Abuſe of Celotomia, *Helmſtadt*, *Ann.* 1728.

Truſſes proper for the Enterocele.

VII. The beſt Truſſes for this Diſorder are thoſe, which compreſs the Part, ſo as to prevent a Relapſe of the Inteſtines. Of thoſe there are a great Variety, contrived in various Shapes, for a Rupture, not only on one Side, but on both: the beſt of which are exhibited in *Tab.* XXV. *Fig.* 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15. They may be made of various Materials. But the ſmaller, for Infants, ſhould be compoſed of ſoft Leather, or lined with Callico, ſtuffed with Cotton: the ſtronger and larger Truſſes may be compoſed of ſteel or ſtrong Leather. Theſe are to be applied ſo, as to compreſs the Orifice of the Rupture, which will probably unite ſoon after, and prevent a Relapſe of the Diſorder. But the Patient ſhould not leave them off, for at leaſt the Space of half a Year: during which time, and ever after, he ſhould uſe a ſpare Diet, and avoid Strainings of all Kinds, violent Exerciſe, Riding, Vomits. And conſtantly uſe laxative Medicines, as there may be occaſion; leſt by a too violent Preſſure of the abdominal Muſcles the Inteſtines ſhould be again forced down. By this Means the Rupture may be cured, even in thoſe who are

[a] About the End of the laſt Century, there was one PRIOR DE CABRIER in *France*, who boaſted himſelf poſſeſſed of a ſecret Medicine, by which all Ruptures were curable, without the Operation, or any Truſſes. This Arcanum was purchaſed of him by the *French* King *Lewis* XIV, at a high Rate, who afterwards made it public for the common Good: when it appeared to be nothing but *Sp. Salis*, to be taken in a certain Quantity, every Day, in Red Wine, for a conſiderable Time; but to no Purpoſe, without a Truſs, *Vide* VERDUC on Bandages, and DIONIS, *Surg. Chap.* on Ruptures.

above thirty (if the Diſorder be recent, and the Surgeon's Aſſiſtance timely called in) without any Uſe of the Knife, which would be here more pernicious than ſerviceable.

VIII. Another Method of reducing the Enterocele is by Celotomy, or Inciſion before mentioned: which is often practiſed by Mountebanks, generally deprived the Patient of his Teſticle in the Operation. But it is condemned by all prudent Surgeons, upon many Accounts; eſpecially as it deprives them of a moſt neceſſary Organ, by a dangerous and excruciating Operation, without any Advantage. Not but that it is neceſſary to make an Inciſion through the Integuments, to return the Inteſtine, when it cannot be reduced by any other Means. Celotomy deſcribed.

IX. The Patient is firſt laid upon a Table, with his Head inclined backward, his Hips elevated, and all his Limbs and Head ſecured from moving, by faſtening them with Ligatures to the Table, or by holding with the Hands of Aſſiſtants. The Operator then protrudes the Inteſtine into the Abdomen; after which an Aſſiſtant compreſſes the ruptured Part, or dilated Ring, with his Hand. The anterior Part of the Scrotum of the affected Side is then elevated, and opened by a longitudinal Inciſion: the Sides of the Wound are dilated, ſo as to diſcover the Proceſs of the Peritonæum, which is then ſeparated, together with the Teſticle, from the Adjacent Parts by the Fingers, and taken out of the Scrotum, to the great Torment of the Patient. The diſtended Part of the Proceſs of the Peritonæum is then drawn down, and firmly tied together with the ſpermatic Veſſels, by a ſilk Ligature: but others divide the ſpermatic Veſſels firſt, and then ſeparate the Scrotum from the Teſticle, which they conceal in one Hand from the Eyes of the Aſſiſtants. The Part is then dreſſed with Lint, Plaſter, Compreſs, and Bandage, and dreſſed the following Days with *Ol. Ovar. Hyperici*, or ſome other vulnerary Balſam; till the Ligature, which tied the Proceſs of the Peritonæum, and ſpermatic Veſſels, is digeſted off, which uſually happens ſix or ſeven Days after the Operation. The reſt of the Cure being perfected, as in other Wounds. And thus the Patient either recovers, or dies of a Fever and Convulſions, from the Severity of the Operation. Yet there is a more ſevere Method extant in the Writings of FABRICIUS AB AQUAPENDENTE and SCULTETUS, practiſed in *Italy*; by which the Proceſs of the Peritonæum is firſt tied, by paſſing a Needle and ſtrong wax'd Thread round it; after which they cut off the Teſticle, and apply an actual Cautery to the ſpermatic Veſſels. The Method of Performing Celotomy, uſed by Mountebanks.

X. Another Method called the Puncture, and accurately deſcribed by PAREY and GEIGER, conſiſts chiefly in paſſing a ſmall gold Wire round the upper Part of the Proceſs of the Peritonæum near the Ring of the abdominal Muſcles; leaving the Teſticle in its natural Poſition. The gold Wire is twiſted by a Pair of Forceps, ſo as to confine the Proceſs of the Peritonæum, without compreſſing the ſpermatic Veſſels, in order to prevent the Inteſtine from falling through it again. But this Operation ſeems to me uſeleſs, and incapable of ſucceeding. For if the Wire is not drawn cloſe, the Inteſtine will eaſily protrude it down, and dilate the Proceſs as before: but if it be drawn cloſe, the ſpermatic Veſſels will be compreſſed, and conſequently the Teſticle will mortify. Nor is it poſſible to conceive how the Wound can heal, but will rather be a continual Ulcer, from the conſtant Irritation of the Wire in the Method of Cure with gold Wire.

the Wound: upon which account it has been deſervedly treated with Neglect by all prudent Surgeons.

LITTLE JOHN's Method. XI. I had lately an Account ſent me from *England* by Mr. JOHN DOUGLAS, of a Phyſician, there named LITTLE JOHN, whoſe Operation in this Diſorder differed from others, in applying Oil of Vitriol, or other ſtrong Cauſtics. After the Rupture is reduced, he applies the Cauſtic above the *Os Pubis*, in ſuch a Quantity, as may quickly eat through the Skin; for the larger Eſchar it made, the more effectual and uſeful it would prove. For this Reaſon, the Application was repeated for two or three Days, that it might the more effectually corrode the Skin, removing the old Eſchar, every Time, before the Application of the Oil of Vitriol, that it might the more effectually penetrate. The Eſchar was then dreſſed with a Plaſter of *Oxycroc. & Paracelſ.* mixed in equal Parts, and ſpread upon Leather, retained with Compreſſes and Bandage; the Uſe of which Plaſter was to ſeparate the Eſchar, in order to cure the Ulcer. If any luxuriant or ſpongy Fleſh appeared, he directed it to be taken down with *Lap. Infernalis*; keeping the Patient to a ſpare Diet, without the leaſt Exerciſe, till the Wound was cured. After this the *Empl. ad Herniam* was applied to the Cicatrix, and ſecured by a proper Bandage, which the Patient continued to wear, till the Reſiſtance of the Cicatrix was ſufficient to prevent a Relapſe of the Diſorder. He had five thouſand Pounds given him for the Diſcovery of this Method by King *George* I. notwithſtanding which, it quickly became contemptible, and in diſuſe among moſt of the *Engliſh* Surgeons. See HOUSTON's Hiſtory of Ruptures, and DOUGLAS's Syllabus of chirurgical Operations.

Another Method by SERMECIUS. XII. SERMECIUS, in his Treatiſe of Lithotomy, mentions another much better Method of curing Ruptures, without the loſs of the Teſticle, which he learnt among the *Ruſſians*. A longitudinal Inciſion was firſt made in the Inguen; and the Proceſs of the Peritonæum, containing the Inteſtine, was then freed from the Parts: after returning the Inteſtine and drawing the Saccus ſtrongly out of the Wound, it was tied with a ſtrong Thread, as near as poſſible to the abdominal Muſcles (ſee *Tab.* XXV. *Fig.* 4. BB.) The Ligature was then left hanging out of the Wound, which was dreſſed in the uſual Manner, till it digeſted off of itſelf. By this Method, he aſſures us, many have been cured, without Injury to the Teſticle or ſpermatic Veſſels. This Method is by SERMECIUS recommended, as of the greateſt Uſe in Adults, where the Inteſtine cannot be retained in the Abdomen by Bandage. I have ſome Time ſince received a Treatiſe from an *Helvetian*, whoſe Name is FREITAGE; in which he mentions this Method, and ſays it was practiſed often by his Father with great Succeſs, as deſcribed by SERMECIUS: with this Difference only, that he perforated the Saccus with a Needle and Thread before he tied it up. This is a very uſeful and neceſſary Caution, to prevent the Ligature's ſlipping.

Another Method by facrifying. the Ring of the Abdomen. XIII. In order to preſerve the Teſticle, ſome Surgeons do not tie the Proceſs of the Peritonæum and ſpermatic Veſſels with a Ligature: but having returned the Inteſtines and Omentum, they then ſcarify the Ring of the Abdomen or Aperture, through which the Inteſtine prolapſed, together with the Skin, in order to render the Cicatrix more firm. By which Means, many have been cured of theſe Ruptures; eſpecially if they continue to wear a proper Bandage for

for a conſiderable Time afterwards. But I think the Operation may ſucceed better in Infants than in Adults.

What is to be done when the Inteſtines are not returnable by adhering.

XIV. If in the Enterocele the Inteſtine cannot be reduced, eſpecially if it adhere to the Proceſs of the Peritonæum, Ring of the abdominal Muſcles, Scrotum, or Teſticle, the Patient being afflicted with the iliac Paſſion, and other Symptoms in that Caſe; no Truſs or Bandage will be of any Service, but rather increaſe the Inflammation, Pain, and other bad Symptoms. There is then but one Method of ſaving the Patient, by a ſevere Operation. In order to which the Patient is to be placed, and the Integuments divided, as we before directed, in N° 8. and in *Chap.* CXVI. N° 2. *& ſeq.* And when the Sacculus appears, it is to be carefully ſeparated, and a ſmall Aperture made in it big enough to introduce a Quill, or ſome ſuch other Inſtrument, to ſeparate the Inteſtine from all its Adheſions, before it is protruded into the Abdomen: which ſhould be always done in the Enterocele incarcerata, when the Inteſtine adheres. Then the Wound is to be healed, and the Patient ſecured from a Relapſe, by continual wearing the Bandage *Spica*. But if there be no Adheſion to the neighbouring Parts, no iliac Paſſion or other bad Symptoms, I would by no means adviſe this dangerous Operation: but recommend a ſimple Bandage, to ſuſpend the Rupture.

Method of treating the Enterocele incarcerata.

XV. If the Stricture of the Inteſtine is ſo great, as to render all Means ineffectual to reduce the Rupture, eſpecially Bleeding, Cataplaſms, Clyſters, and particularly the Clyſma Fumoſum of Tobacco; the Surgeon muſt then have Recourſe to the Knife, to ſave the Patient, as we before propoſed in the Bubonocele incarcerata, *Chap.* CXVI. The better to illuſtrate and explain this difficult Operation to our Reader, we have ſupplied him with Figures, *Tab.* XXVI. *Fig.* 1, 2, 3. from the Treatiſe of incarcerated Ruptures of the Scrotum by MAUCHART, before recommended by us; which we ſhall conſider more at large in the Explanation; and at preſent conclude with the following neceſſary Obſervations.

Neceſſary Obſervations in the Enterocele.

XVI. 1ſt, When the Rupture is not attended with bad Symptoms, but is reducible, without any Diviſion of the Sacculus; in that Caſe, the Integuments are to be divided, in ſuch a Manner, that the Sacculus may be diſtinctly viewed. After which, the prolapſed Inteſtine may be returned into the Abdomen, without much Difficulty, and the Remainder of the Cure performed, as we have directed in the Bubonocele, *Chap.* CXVI. N° 2. But 2dly, when the Rupture is of a worſe Kind, or when the Omentum or Inteſtine adheres, and a large Quantity of ſome Humour contained in the Sacculus; then the preceding Method is not ſo convenient: but the Sacculus ſhould be divided, and the Inteſtine carefully returned. But if its Return ſhould be obſtructed by a Stricture at the Ring of the abdominal Muſcles, that Stricture ſhould be firſt dilated by Inciſion; and after freeing the Inteſtine or Omentum from all its Adheſions, they may be returned as before. But the Inteſtine ſhould be treated ſo tenderly, as rather to divide the Part, to which it adheres, even if it be the Teſticle itſelf[a], than injure its own proper Coats. In the next Place, the Sacculus

[a] Some are for extirpating the Teſticle, when it adheres to the Inteſtine; but I rather approve of cutting off a ſmall Portion only, as a Wound of the Teſticle will heal. GARENGEOT ſays, he has found the prolapſed Inteſtine and the Teſticle confuſed together in one Sacculus; which muſt be very rare, being hardly ever obſerved by others, becauſe the Teſticle is included in a Sacculus of its own.

of the Peritonæum is to be freed from all its Parts, and ſecured by a Ligature, tied round near the Ring of the abdominal Muſcles, made of a flaxen Thread waxed, and three or four Times doubled: after which, that part of the Sacculus below the Ligature is to be extirpated, and the Wound dreſſed as before. When the Ligature is digeſted off, it forms a Sort of Tubercle or hard Cicatrix; which being joined by Scarification to the Lips of the Wound, firmly reſiſts the Preſſure of the Inteſtine, and prevents it from ſubſiding into the Scrotum: but in the mean Time, the Surgeon ſhould be careful not to paſs the Ligature round the ſpermatic Veſſels. If 3^{dly}, one of the epigaſtric Arteries ſhould be divided in the Operation, it ſhould be immediately taken up with a Needle and Thread, or compreſſed by an Aſſiſtant, till the Operation is over. But 4^{thly}, if the prolapſed Inteſtine is diſtended with Wind or Fæces, ſo that it cannot be returned, its Contents ſhould then be gradually protruded into the neighbouring Parts extracted gently from the Abdomen; by which Means the flaccid Inteſtine will more eaſily return. But I ſhould rather approve of dilating the Stricture by Inciſion, when neceſſary than endanger a Contuſion, by forcing it through an Aperture too ſtrict; proceeding afterwards, as we have directed in the Bubonocele incarcerata, *Chap.* CXVI. 5^{thly}, If the Meſentery ſhould alſo accompany the Inteſtine in the Rupture, it ſhould, according to the Obſervation of PETIT, be returned firſt: but if the Omentum accompanies it, then the Inteſtine ſhould be returned firſt, and the Omentum laſt. 6^{thly}, If the Inteſtine ſhould happen to be wounded in dividing the Sacculus, it ſhould be joined together by the knotted Suture, and faſtened by the Thread to the Wound of the Abdomen, and afterwards treated according to our Directions in Wounds of the Inteſtines. 7^{thly}, If the Inteſtine ſhould be ſphacelated or mortified, the dead Part is to be cut off, and the Sound ſtitched to the Margin of the Wound: or, according to LE DRAN, the corrupted Part may be left uncut, dreſſed with a digeſtive Ointment, Lint, and Compreſſes; by which Method it will gradually waſte and drop of its own accord: and the Wound is afterwards to be healed with a vulnerary Balſam, as in a Bubonocele. 8^{thly}, If Part of the Bladder ſhould come through the Ring of the abdominal Muſcles, as it ſometimes does in gravid Women, that ſhould be firſt returned before the Inteſtine. 9^{thly}, The ſuperfluous Parts of the Integument in the Scrotum may be but off, to render the Cicatrix ſtronger and more uniform. Laſtly and 10^{thly}, the Scrotum and Parts affected are to be defended with Compreſſes, and ſecured by the Bandage Spica, or ſome other, for the ſame Purpoſe.

CHAP. CXX.

Of the EPIPLOCELE, *or Prolapſus of the Omentum into the Scrotum.*

Epiplocele deſcribed.

I. AN *Epiplocele* is here, that Species of Rupture, in which the Omentum ſubſides into the Scrotum. This Rupture is not ſo eaſily diſcoverable as the Enterocele: but it always ſhews itſelf by a ſoft Inequality or Tumor, which increaſes a little upon ſtraining or contracting the abdominal Muſcles

Upon

Upon preſſing it with the Fingers there is no murmuring Noiſe made, as in the Enterocele; and the Reſiſtance of it is alſo different. Sometimes the Omentum may be returned into the Abdomen without Difficulty, in this Rupture; and ſometimes it adheres ſo ſtrictly to the adjacent Parts, or is ſo much enlarged, that a Reduction of the Tumor can be by no Means effected: Both which I obſerved in opening a male Subject after Death [a]. Though there are ſome who deny, or at leaſt queſtion, the Exiſtence of theſe Ruptures; for which they may have ſome Reaſon, as the Diſeaſe ſeldom occurs, according to the Obſervation of VESALIUS [b]. Nor is the *Epiplocele* ever ſo large or dangerous as the *Enterocele*; being, for the Generality, attended with no bad Symptoms, and often tolerable, during the Life of the Patient, without any Aſſiſtance from the Surgeon. The Reaſon why this Rupture ſo ſeldom happens, is, from the Shortneſs of the Omentum in moſt Subjects, which Anatomy aſſures us is but ſeldom long enough to reach (and conſequently cannot ſubſide into) the Proceſſes of the Peritonæum. Sometimes a Tumor or Enlargement of the *Membrana Adipoſa* in the lower Part of the Abdomen has been miſtaken by Phyſicians and Surgeons for an *Epiplocele*, or an *Enterocele*. At other Times the true *Epiplocele* has been attended with the ſame Signs and malignant Symptoms as the *Enterocele incarcerata*, ſo as to make the Operation abſolutely neceſſary: in which nothing appeared to the Surgeon but the prolapſed Omentum, as we read in the chirurgical Writings of RUYSCH, DIONIS, and GARENGEOT, on this Diſorder.

II. The Cure of an *Epiplocele* conſiſts principally in a Reduction of the Tumor, by returning the Omentum again into the Abdomen; and in ſecuring the Parts from a Relapſe, by a Truſs or Bandage, as in the *Hernia Inguinalis* and *Scrotalis*. If the Omentum cannot be returned into the Abdomen, and the Patient, notwithſtanding, has little or no Uneaſineſs; it ſeems better to leave the Diſorder to itſelf, than cure it by the Operation, which is a Remedy worſe than the Diſeaſe: But when the prolapſed Omentum is much enlarged, inflamed, or attended with great Pain, Fever, and Vomiting, as is uſual in the *Enterocele incarcerata*; the Surgeon ſhould then haſten to the Operation without further Delay, as we have directed in the *Hernia Inguinalis* and *Scrotalis incarcerata*. Care ſhould be taken in the Operation not to return any Part of the Omentum, which is corrupted: but after tying it with a Ligature, let it be cut off from the Sound, as we before adviſed in Wounds of the Abdomen [c]. Or if the Surgeon pleaſes, he may wait a ſpontaneous Separation or caſting off the mortified from the ſound Parts, without a Ligature. It may be worth the Reader's while to peruſe the Obſervations of LE DRAN on this Diſorder, II. *Obſ.* 63. *& ſeq.* Cure of the Epiplocele.

III. Sometimes the Inteſtine falls down together with the Omentum, which denominates the Rupture an *Entero-epiplocele*; but is hardly diſtinguiſhable from the ſimple Enterocele. Nor does it much ſignify whether it be diſtinguiſhed or not; ſince the Symptoms and Method of Cure are the ſame in both. But Method of treating the Entero-epiplocele.

[a] This Caſe is deſcribed by me in *Ephem. Nat. Cur. Cent.* V. *Obſ.* 85. *Pag.* 164.

[b] *De Corporis Humani Fabrica, Lib.* V. *Cap.* 4.

[c] GARENGEOT, though he rejects paſſing a Ligature above the unſound Part of the Omentum in Wounds of the Abdomen, yet approves of it in the Operation for Ruptures, *Pag.* 337. *Edit.* II.

if Part of the Tumor ſubſides, or returns into the Abdomen, and leaves a ſoft reſiſting Subſtance behind; it is probable, that the Omentum accompanies the Inteſtine: And then the Caſe is uſually not ſo dangerous, as when the Inteſtine prolapſes alone: becauſe the ſoft and fat Subſtance of the Omentum prevents the Rings of the abdominal Muſcles from making ſo intenſe a Stricture on the Inteſtine. The cure conſiſts chiefly in returning the Inteſtine and Omentum into the Abdomen, with or without the Operation, healing the Wound, and ſecuring the Parts as we have before directed in the *Enterocele*.

Hernia Veſicæ. IV. The Bladder ſometimes prolapſes through the Ring of the abdominal Muſcles, and ſometimes Part of it deſcends into the Scrotum, in gravid Patients, or thoſe that have the Stranguary: though there are Inſtances of it, without either of theſe Cauſes. It is called a Rupture of the Bladder or Cyſtocele. It is known by the Softneſs of the Swelling, a frequent Stimulus of Urine attended with great Difficulty; which is leſſened either by elevating the Tumor, or gently compreſſing it. It generally decreaſes on the Evacuation of Urine. For the Cure of this Diſorder, that Part of the Bladder, which is prolapſed, muſt be returned in the ſame Manner as we directed for the Inteſtines, and then retained in its Place by a proper Bandage.

Hernia Pubis. V. The Rupture *ad Oſſa Pubis* is known by a Swelling round the Foramen Magnum; which either returns voluntarily, or is eaſily replaced by the Preſſure of the Fingers, when the Patient lies on his Back and the Inteſtines are free. When it is returned, the Treatment ſhould proceed as we directed above in the Bubonocele, *Chap.* CXVI. If it prove incarcerated, I refer you to the ſame Method as in Bubonocele incarcerata, *Chap.* CXVII. But you muſt take great Care not to wound the Artery that paſſes through the Foramen Ovale, for fear of a violent and dangerous Hæmorrhage.

Hernia Vaginæ Uteri. VI. The Hernia Vaginæ Uteri is by the Moderns acknowledged to be the ſame as the Prolapſus Uteri, conſiſting in a Relaxation of the Vagina. This Rupture is protruded from the Inteſtines into the Cavity of the Vagina; and is very troubleſome to the Patient. That the Inteſtines are encloſed in this Tumor or Sacculus, is diſcovered by the Fingers; by whoſe Aſſiſtance they are returned into the Abdomen. The Cure is performed by a proper Peſſary; ſuch as I have repreſented (for the Prolapſus Uteri) *Plate* XXXIV. *Fig.* 6, 7, 8, 9, 10, 11. Or by a Sponge, adapted to the Purpoſe, of a Cylindrical Form. As this Vaginæ Prolapſus, ſo likewiſe the Inverſio Uteri in Partu is a Species of the Rupture in which the Inteſtines are incloſed: Of the Danger of which, and its difficult Cure, ſee further, *Chap.* CLVII. *Sect.* V.

CHAP. CXXI.

Of ſpurious Ruptures, and firſt of the SARCOCELE, *and* CASTRATION.

Sarcocele deſcribed. I. SPurious Ruptures are thoſe Tumors formed in the Scrotum, not from a Prolapſion of the Inteſtines or Omentum out of the Abdomen, but a Collection of Humours, a Scirrhoſity of the Teſticle or a Dilatation of its ſpermatic Veſſels: and a *Sarcocele* in particular is, when the Teſticle is conſiderably tumified and indurated, like a Scirrhus; or much enlarged by a fleſhy Excreſ-

cence, which is frequently attended with acute Pains, and ſometimes Ulceration, ſo as to degenerate at laſt into a true cancerous Diſpoſition: which has ſeveral Times happened within my own Obſervation. Both theſe Kinds of the Sarcocele are very different from an Inflammation of the Teſticle, as they advance but ſlowly, and are, in their firſt Stage, attended with little or no Pain: whereas a *Phlegmon* of the Teſticle begins with intenſe Heat and Pain, and quickly terminates as in other Inflammations. Nor does the Sarcocele proceed uſually from one and the ſame Cauſe. But when the Tumor of the Teſticle is accompanied with Hardneſs, the Cauſes are much the ſame with thoſe beforementioned, in a Scirrhus (*Part* I. *Book* IV. *Chap.* XVII.) When the Teſticle is enlarged by a Kind of fleſhy Excreſcence, then the Cauſe of the Diſorder is uſually ſome Contuſion, or other exernal Violence. But I remember a Patient, who had a Sarcocele of this Kind, and could not recollect that he had received any ſuch external Injury. The Sarcocele differs as to its *magnitude*, being frequently no larger than a Hen's Egg: though I have cured ſome Patients, in which the Teſticle has been bigger than one's Fiſt; and ſome of them I now keep by me in Spirits.

II. The *Signs*, by which a Sarcocele may be diſtinguiſhed from other Ruptures, are principally the Hardneſs of the Tumor, and its Seat being in the Teſticle: whereas the true Herniæ are diſtinct from the Teſticle, and ſofter to the Touch. If a Sarcocele be not timely brought to Suppuration, it very eaſily degenerates into a Cancer, as we are aſſured by daily Experience, or at leaſt becomes exceeding troubleſome by its Bulk and Pain: and if both Teſticles are affected, it frequently renders the Patient impotent. If the Tumor proceeds through the Inguen up to the Abdomen, even Caſtration will be uſeleſs, and Death the Conſequence; becauſe the Diſorder is communicated from without internally: and therefore it will be more adviſeable for the Surgeon to deſiſt from the Operation.

III. A recent Sarcocele may frequent be ſuppurated by digeſtive Medicines, as well internal as external. MATTHIOLUS, AQUAPENDENS, and SCULTETUS, tell us, *Rad. Ononidis* ℥ i. given to the Patient every Day *in Hauſt. vin. Abſynthit.* is of great Efficacy: and externally the following Plaſter is to be applied: Cure by Medicines.

℞ *Gumm. Galban. Ammoniac. Bdell. aa* ℥ *ſs. diſſolut. in aceto adde Adip. anat. liq. & colat.* ℥ i. *ſs. Cer. citrin.* ℥ ii. *Ol. Lilior. alb. Medull. crur. bov. aa* ℥ *x. M. F. Emplaſtrum.*

This is to be ſpread on Linen, and renewed on the Part every third Day. DIONIS, treating of this Diſorder in his Surgery, propoſes a Mixture, *Ex Emplaſt. Diabotano, Divino, & Vigonis aa*; which he tells us he has ſometimes applied with Succeſs. Some prefer the *Emplaſt. Noriberg.* as a good Digeſtive in this Caſe, uſed either ſeparately, or mixed with the preceding. Some recommend the *Emplaſt. de Cumin. vel e Baccis Lauri.* Others again extol the Vapour or Acid Fomentation, which we propoſed in the Cure of a Scirrhus beforegoing. For internal Medicines, the Decoction of the Woods, with Mercurials, have, in my own Experience, been found of the greateſt Efficacy;

cacy; especially if the Patient takes a Sudorific every Morning, with a proper Regimen, and a mercurial Purge every third or fourth Day. It may be useful also to salivate; especially if it arise from a suppressed Gonorrhæa. See HOFFMAN, *Med. Consult.* P. III. p. 241.

Cure by Castration.

IV. When other Medicines prove ineffectual, the Size and Pain of the Tumor increase, and it seems inclined towards a cancerous Disposition; if it has not yet reached the Ring of the abdominal Muscles, there is then but one Means left of relieving the Patient by a painful Operation, from an otherwise incurable [a] and fatal Disorder. And that is a dextrous and timely Extirpation of the disordered Testicle, or both, if they are affected, by the Scalpel; which is termed Castration, and renders the Patient impotent, when he is this way deprived of both Testicles.

Method of castrating.

V. The Operation for Castration is performed much in the same Manner as Celotomy, *Chap.* CXIX. N°. 6. but it should be done with more Circumspection and Tenderness. The spermatic Vessels should be first tied securely with a Ligature near the Inguen or Abdomen, and afterwards divided, to give the Patient less Pain: and the Wound may then be treated, as we have directed in the Cure of Ruptures. As a Division of the spermatic Vessels, which are so much enlarged, may be attended with a fatal Hæmorrhage, the most prudent Surgeons do for the greater Security pass a double Ligature round those Vessels, one below the other: or else they do not immediately extirpate the Testicle, as soon as it has been freed from the Scrotum, and its Vessels strictly tied; but they return it, and wait a few Days, till the Testicle begins to grow flaccid, and mortifies; which is a Sign the spermatic Vessels are well secured, and may be then divided without any Danger. But if that does not follow, the Ligature is not strict enough; and therefore another must be made much tighter. LE DRAN rightly advises a Needle and double Thread to be passed through the Spermatics, and so to tie them in two halves; as a more certain Method of preventing a future Hæmorrhage. AQUAPENDENS, SCULTETUS, and others, apply an actual Cautery to the divided spermatic Vessels: which severe Practice is, in my Opinion, deservedly rejected by the Moderns for the Ligature. Castration is therefore absolutely necessary for removing a cancerous Sarcocele, which is otherwise incurable: nor is the Objection to it great, because one sound Testicle is sufficient for Procreation. I am not ignorant, that some advise a Separation of the Nerve from the spermatic Vessels, before the Ligature be made, to prevent Convulsions, as they say, from the Stricture on it. But that is both unnecessary and impracticable: unnecessary, because a Convulsion hardly ever follows the Stricture of the Ligature on so small a Nerve; and impracticable, because the Nerve is surprizingly ramified, and interwove with the spermatic Vessels, as we are assured by Anatomy, of which they must certainly be ignorant, who advise such a Practice. However, it may not be amiss to pass a Compress of Lint under the Ligature, about an Inch below which the Vessels should be divided.

[a] That the Disorder is frequently incurable by any Means, is confirmed, as well by the Observation of myself as others; and particularly WEPFER, *De Cicut. Aquat.* pag. 101. mentions a cancerous Sarcocele, that weighed above two Pounds.

VI. If a Patient ſhould be troubled with a fleſhy Excreſcence upon his Teſticle, which is in other Reſpects ſound, and finds no Relief from Medicines; the Teſticle may be preſerved, and the Patient freed from his Diſorder by opening the Scrotum, and extirpating the offending Part only. But if it is rooted in the Teſticle, or cannot be taken cleanly off; it will be neceſſary, either to remove the whole Teſticle, or ſome Part of it[a]. After which, ſo much of the Integuments of the Scroum, as are ſuperfluous, may be alſo extirpated with a Pair of Sciſſars; by which Means the Wound will heal with more Eaſe and Uniformity. With regard to the Dreſſing, that is to be made with ſcraped Lint and Compreſſes, ſecured by the Bandage *Spica Inguinalis*; and to abate the Inflammation, which ſometimes ariſes, a diſcutient Cataplaſm may be uſed, and the Wound afterwards treated with ſome digeſtive Ointment or vulnerary Balſam. Obſervations on Caſtration may be ſeen in TULPIUS, *Obſ. Lib.* IV. *Cap.* 32. and SAVIARD, *Obſ. Chir.* 125.

Method of treating an Excreſcence of the Teſticle.

CHAP. CXXII.

Of the HYDROCELE.

I. WE frequently meet with the Scrotum diſtended in ſome Subjects with a watery Humour, even ſometimes to the Size of one's Head; without Pain indeed, but exceeding troubleſome to the Patient. This kind of Diſorder has been denominated, after the Greeks, an *Hydrocele*, or *Hernia Aquoſa*. For the Generality, but one Side of the Scrotum, though ſometimes both are diſtended with this Humour: to which all in general are liable, without excepting any Age or Sex. Even the Infant is ſometimes born with this Tumor, or acquires it ſoon after Birth, as I have obſerved. But the Seat, or Part occupied by this Tumor, is not always the ſame: for it is ſometimes included in the *Tunica Vaginalis*, or between the Teſticle, and its including Membrane, in ſuch a Manner, that the Teſticle is thereby concealed from the Touch, and ſeems to ſwim in the Humour; which in that Caſe probably ariſes from a Rupture in ſome of the lymphatic Veſſels of the Teſticle. At other Times the Humour is lodged immediately beneath the Skin of the *Scrotum*, as CELSUS obſerves (*Lib.* VII. *Cap.* 18.) encompaſſing both the Teſticles, particularly in new born Infants and hydropical Subjects. But when the Seat of this Diſorder is in the cellular Membrane of the Scrotum, immediately under the Skin, it is diſtinguiſhed from the *Hydrocele* by the Name of *Hydrops Scrotalis*; which we ſhall therefore conſider by itſelf hereafter. Sometimes again, the Humour has been obſerved collected in the Proceſſes of the *Peritonæum*[b] above the Teſticles: and I remember to have found a large Quantity

Hydrocele deſcribed.

[a] DIONIS and others recommend the Application of Cauſtics to remove Excreſcences of this Part, which may ſometimes ſucceed tolerably well: but I am apt to think the Method by the Knife much more ready and ſafe.

[b] This has been obſerved by WIDEMANNUS (*De Litho & Celotomia*, pag. 84.) BOERHAAVE (*Aphor.* § 1227.) GARENGEOT and LE DRAN (II. *Obſ.* 75.) and I myſelf have alſo felt the Water in one of the Proceſſes of the *Peritonæum* above the Teſticle: which may ſometimes happen after an *En-*

of

of an aqueous Liquor in a dilated Proceſs of the *Peritonæum*, upon a dead Subject that had an *Enterocele*. Sometimes the contained Liquor is of a ſanguine Hue, or is mere Blood extravaſated into the Scrotum, as I have ſeen by Accident. And this Species of the Diſorder may be not improperly termed an *Hæmatocele*, or *Hernia Sanguinolenta*, which was even not unknown to CELSUS (*Lib.* VII. *Cap.* 19.) But more of this hereafter.

Diagnoſis and Prognoſis.

II. The Hydrocele ſhews itſelf by certain Signs, whereby it is not only diſcoverable itſelf, but alſo diſtinguiſhable from other Ruptures. It may be diſcerned (1) from the *Hydrops Scrotalis*, in that the laſt retains the Print of the Finger, the Skin appears pellucid and diſtended, and often the Penis itſelf is much ſwelled: whereas in the Hydrocele the Penis is rather drawn inward, and the Skin corrugated, and ſuſceptible of no Impreſſion from the Finger. In the Hydrocele the Tumor often returns, and diſappears, and feels ſoft to the Touch, when the Humour is not too abundant; but the *Hydrops Scrotalis* is more fixed and reſiſting. The *Hydrocele* is alſo (2) diſtinguiſhable from the *Enterocele* and *Epiplocele*, in that the Teſticle is frequently drowned or concealed in the Water of the firſt; but may be always felt on one Side of the Tumor, in the two laſt. But (3) the Difference betwixt the Hydrocele and Sarcocele is not ſo obvious, but that it has deceived many expert Surgeons. The principal Criterion is the Difference in the Reſiſtance to the Touch, the Sarcocele being much harder than the other, and uſually leſs in Size. I am ſenſible, it is a general Admonition, in diſtinguiſhing this Diſorder, to hold a Candle on one Side of the Patient's Scrotum in the Dark; whereupon the Scrotum will appear in ſome Meaſure pellucid, like a Bladder full of Water. But as myſelf, with CELSUS and ÆGINETA, have frequently obſerved the contained Humours very turbid, bloody, or dark coloured, like Coffee; every expert Surgeon muſt be ſatisfied, that this Method is very fallacious, or at leaſt ought not to be over-much relied on. It is true, ſuch an Appearance will confirm us, that the Tumor is an Hydrocele: but when it does not appear, we can hardly be certain it is no Hydrocele, without other Aſſurances, as the Humours may be bloody and opaque. The Tumor itſelf is generally more troubleſome than dangerous; as it frequently obſtructs the Patient's walking, and prevents him either from ſitting or riding, when of any conſiderable Size. But if it continues a long Time together, there is Danger of the Teſticle being corrupted or vitiated by the offending Humours, ſo as to give riſe to a Sarcocele, Scirrhus, or Cancer, of the Teſticle. On the contrary, I have ſeen ſome Inſtances of the Diſorder being ſuſtained with no bad Conſequences, and but little Incumbrance, during Life. But when the Penis is buried by a too great Diſtention of its Integuments, through a Redundancy of the Humours, it muſt at leaſt greatly obſtruct, if not totally prevent, a Procreation of the Species. Nor is the Diſorder eaſily curable, either by Medicines or Inſtruments; but may be ſooner effected in a young Patient, than one advanced in Years. Sometimes the *Hydrocele* and *Hydrops Scrotalis* are joined together in one Patient: and then the Cure of the firſt is impracticable before a Removal of the laſt.

terocele, when the Inteſtine has penetrated into the *Tunica Vaginalis*, through the Septum, which divides the Teſticle above from the Proceſs of the *Peritonæum*. But this Caſe very ſeldom occurs; nor could I ever meet with the Parts in this State, among the many Subjects, which have been under my Care in both *Hydrocele* and *Enterocele*.

To

To which we may add, that this Diſorder is alſo ſometimes complicated with a Sarcocele or Enterocele.

III. The Hydrocele is frequently curable by Medicines only, in young Patients: when a Courſe of Diſcutients and Corroborants are timely exhibited, and continued both externally and internally. The Application of Linen Compreſſes dipt in *Sp. Vin.* or *Aq. Hungar.* is found of great Service; as is alſo a Decoction of the warm and aromatic Herbs in Wine: To theſe may be added *Aq. Calcis* and *S. V.* at Diſcretion; which ſhould be applied warm to the Part for ſeveral Days together. Nothing can be more efficacious for removing the Hydrocele in new-born Infants, when they are well in other Reſpects, than giving them a little grated or chewed Nutmeg every Morning faſting, breathing frequently upon the Part every Day at the ſame Time: which I ſhould have hardly recommended, but that I am convinced of many Cures performed by it on Infants. *Sp. Vin.* held in the Mouth, and breathed upon the Part, is alſo ſerviceable: and Compreſſes expreſſed out of warm *Sp. Matrical.* and applied ſeveral Times in a Day with *Emp. de Cumino* are ſtill more powerful. For internal Medicines, it may be proper to purge the Patient at Intervals, eſpecially Infants, with *Rad. Rhabarb.* or ſomething that will ſtrengthen the Habit, as well as diſcharge the redundant Humours: and other corroborating and diuretic Medicines may be uſed between the Purges. The celebrated *Arcanum Duplicatum* of LUDOVICUS[a] is ſaid to be of ſurprizing Efficacy for the Hydrocele in Adults; inſomuch that a few Doſes of it continued, with external Roſolvents, will totally diſſipate the Diſorder in a few Days. But I muſt confeſs, my Opinion is, it will be of more ſervice in the *Hydrops Scrotalis* than in the true Hydrocele. If the Diſorder is too obſtinate to give way to theſe Means, as it uſually is, when become inveterate in Adults, the laſt Remedy then left, is the Operation, which itſelf often fails of curing the Patient. When the Hydrocele is accompanied with an Inflammation, the Operation ſhould then be deferred till that is abated.

Cure by Medicines.

IV. The chirurgical Treatment for curing the Hydrocele is of two Kinds. The one is a perfect or radical Cure; the other only imperfect or palliative. There is a two-fold Intention in curing this Diſorder; *viz.* (1) of diſcharging the morbid Humours, and (2) of preventing their Return. To both which, the *Curatio perfecta* is equally accommodated: whereas the palliative Method regards only the Diſcharge of the retained Humours. But as the *Curatio perfecta* confines the Patient for ſeveral Weeks to his Bed, and is both painful, and in ſome Meaſure dangerous; it is not at all ſurprizing, that it ſhould be ſo frequently rejected for the palliative Method, which may be more eaſily and expeditiouſly performed, with much leſs Pain and Danger. For which Reaſon we ſhall here firſt conſider the *Curatio palliativa.*

Cure by Operation.

V. The Lancet was in uſe among the Ancients for diſcharging the contained Humours. But the Moderns juſtly prefer the *Trocar, Tab.* XXIV. *Fig.* 1. which is much more convenient for the ſame Purpoſe. The Method of performing the Operation is this: The Patient ſtanding upright, or being ſeated on the Edge of a Chair, the contained Humours are then preſſed downward, from the upper Part of the Scrotum, to diſtend the lower; which is thus

The palliative Method of Cure.

[a] *Vide Miſcell. Nat. Curioſ. Dec.* I. *Ann.* 9 and 10. *Obſ.* 158. & *Opera ejuſd. Pag.* 720.

kept

kept diſtended, by paſſing a flat Ligature gently about its upper Part. Next the Trocar, of about a Finger's Breadth long, ſufficient to paſs through the Integuments, which are here thicker than uſual, is to be cautiouſly inſerted into the lower Part of the Scrotum, directing its Point outward, to avoid injuring the Teſticle. The Scrotum thus perforated, after drawing out the Trocar, the Cannula is left behind, to diſcharge the contained Humours: which done, the Cannula is alſo extracted, which compleats the Operation. The Wound is ſo trifling, as to heal of itſelf, without any Plaſter or other Medicine: and the Patient is then diſmiſſed to walk about his Buſineſs. Yet it may not be amiſs to follow the Practice of ſome, who apply thick Compreſſes to the Scrotum, moiſtened in *Aq. Calc. & S. V.* after the Operation. But if contained Humours are alſo lodged in the Proceſs of the Peritonæum, above the Teſticle, they are to be alſo diſcharged by another Paracenteſis. And as the Scrotum will fill again within a few Months after the Operation, it will be neceſſary to repeat the Paracenteſis when there is another Occaſion; leſt the ſtagnating Juices ſhould contract an Acrimony, and affect the Teſticles and internal Parts, ſo as to excite a worſe Diſorder. Thus the Operation may be repeated in Proportion to the Return of the Diſorder, without much Trouble to the Patient, whom I have ſometimes known ſurvive to a great Age[a]. Even in robuſt and young Subjects a perfect Cure will be ſometimes made by the firſt Extraction: but as thoſe Inſtances occur but ſeldom, this Method of Cure has been juſtly termed palliative only. If the contained Humours ſhould in proceſs of Time become diſcoloured, fœtid, acrimonious, or ſo thick, as not to paſs through the Cannula, or if they reſemble Blood, it will then be neceſſary to proceed to the *Curatio perfecta*. This GARENGEOT alſo adviſes, for the Removal of extravaſated Blood from a Wound in ſome of the larger Veſſels in the Scrotum, and in order to tie up the Veſſels.

Curatio perfecta deſcribed.

VI. There are five Ways of operating for obtaining a perfect Cure of this Diſorder; each of which we ſhall deſcribe in order. The firſt is by laying the Patient on his Back on his Bed, or a Table, and ſecuring him by Ligatures or the Hands of Aſſiſtants, as in the Operation for Celotomy. The upper Part of the Scrotum is then divided on one Side, where the Humour is lodged, by the Scalpel G or I (*Tab.* I.) till a ſufficient Opening be made into the Cavity of the Scrotum, which may be ſafely divided down to the Bottom by the Inciſion Knife, and Director, or which is better, by the Forefinger of the left Hand, and a Pair of Probe Sciſſars. After diſcharging the Water, if the Teſticle appears ſound, the Cavity of the Scrotum is to be directly filled with ſcraped Lint, to be retained with proper Compreſſes, and the Bandage T. After removing this Lint, in the ſucceeding Dreſſings the whole Cavity of the Wound is to be treated with Digeſtives, that its callous Membrane or Lining may be caſt off, and the ſmall Veſſels laid bare and healed, to prevent their future Diſcharge of a like Humour. But if the indurated Sacculus is of too hard a Conſiſtence to be diſſolved by ſimple digeſtive Ointment, it may be proper to ſcarify the Inſide of the Scrotum, and mix a little *Merc. præcipit. rub.* with the Ointment; or it may be only ſprinkled on the Surface

[a] *Vide* SCULTETI *Armament. Chirurg.* Tab. XL. *Fig.* 2.

of

of it when ſpread on the Lint. If that will not diſſolve it, the Surgeon may remove as much of the toughest Part of it, as he well can, with the Scalpel or Sciſſars; and treat the reſt with *Præcip. rub. cum alum. uſt.* upon ſome digeſtive Ointment. When the Wound appears to be ſufficiently cleanſed, it may be healed up with ſome vulnerary Balſam. Sometimes an adipoſe Excreſcence appears in the Cavity of the Scrotum, which ſhould then be removed like the callous Lining. If the ſpermatic Veſſels ſhould appear tumified after opening the Scrotum, the Surgeon ſhould not precipitately conclude, that the Teſticle is therefore ſpoiled, and extirpate it, as uſeleſs, according to the Advice of ſome; when it is probable, thoſe Veſſels will return to their natural State again, without any farther Aſſiſtance. But when the ſpermatic Veſſels appear indurated, as well as tumified, and give the Patient intolerable Pain; they may then be tied up, and the Teſticle extirpated, as we directed in the Sarcocele. It ſhould be alſo obſerved, whether the enlarged Teſticle contains any Lymph or Matter: and if it does, it ſhould be rather opened and cleanſed, than haſtily and totally extirpated; becauſe it frequently heals again, and performs its uſual Office. But if it be found much indurated, or greatly corrupted, it is moſt adviſeable to remove it, as before, to prevent it from degenerating into a Cancer for the future. And laſtly, if the indurated Sacculus ſhould be above the Teſticle, from the Hydrocele being formed in the Proceſs of the Peritonæum; great Care ſhould be taken, in ſeparating it by the Knife, not to injure the ſubjacent Teſticle.

VII. As many, who are afflicted with this Diſorder, will not ſubmit to the Operation, for fear of the Knife, the Scrotum may be conveniently opened, and the included Humours diſcharged by a Cauſtic. In order to this, a large Piece of Plaſter may be perforated in the Middle, and applied to the outſide of the Scrotum: and the Cauſtic being laid on, the Perforation may be retained with a Linen Compreſs, another whole Plaſter, and the Bandage T, as we before directed in the Chapter on the Application of Cauſtics. If the Cauſtic is not quite ſtrong enough to penetrate through the Integuments of the Scrotum, the Eſchar may be divided by a Probe Scalpel, or other Inſtrument, to diſcharge the Water: and after cleanſing the Wound, and filling it with dry Lint, it may be treated as before, till the Patient is recovered. And by this Method I have perfectly cured ſeveral. GARENGEOT is greatly afraid of the Cauſtic mixing with the included Humours, and affecting the Teſticle with malignant Symptoms: but his Fears are imaginary. For the Cauſtic no ſooner makes its way through the Integuments of the Scrotum, but it is preſſed out, and waſhed off by the diſcharging Water; and if any Part ſhould enter the Scrotum, it will be ſo diluted with the Humours, as to prove inoffenſive. Nor did I ever obſerve any ill Conſequence attend this Practice, though I have ſo often made trial thereof by Experience. DOUGLAS, in this Caſe, prefers the Cauſtic to the Puncture, Inciſion and Seton. See *Syllab. Operat. Chirurg. in* 4°. p. 39. The ſecond Method.

VIII. The third Method of performing the *Curatio perfecta* in this Diſorder, is by paſſing a Ligature in a large Needle (like what we adviſed for the Seton, *Tab.* XVIII. *Fig.* 12.) through the upper Part of the Scrotum, on one Side, ſo as to avoid the Teſticle, and bring it out again through the Bottom [a]. The The third Method of operating.

[a] *Vide* SCULTETI *Armament. Chirurg. Tab.* LX. *Fig.* 1. where this is ſhewn.

Ligature is then left in the Scrotum, as in a Seton, and drawn backward and forward once or twice every Day, after it has been rubbed with ſome digeſtive Ointment; by which means the Humours are not only diſcharged, but the indurated Sacculus and ruptured Veins are alſo digeſted off: after which, the Ligature may be extracted, and the Wound healed, as before. If the Suppuration does not ſucceed well enough from the digeſtive Ointment on the Ligature, a little *Merc. præcipit. rub.* may be added as before. But as the peccant Humours and indurated Sacculus cannot well be this way perfectly diſcharged, nor any Obſervation made, whether the Teſticle is ſound or vitiated; the Reader will not be ſurprized to hear, that the two preceding Methods (N° 6. and 7.) are generally preferred and practiſed, as more ſafe and effectual than the preſent. For if any putrid Matter ſhould remain behind, the Teſticle prove ſcirrhus, &c. as in this Method it is very poſſible, the preſent Cure will be not only rendered precarious and uncertain, but the Patient probably ſubjected to a much worſe Diſorder for the future.

The Method of MARINUS and RUYSCH

IX. MARINUS [a], an *Italian* Surgeon, thinks the following Method much preferable to any other, as it is moſtly uſed in that Country. The Patient being properly diſpoſed, the *Scrotum* is then divided in its upper Part immediately under the *Inguen*, by an Inciſion large enough to admit one's Finger, and afterwards a Tent of Wax, about three Fingers breadth along, and the Thickneſs of one Finger, the Point of which is to be a little crooked. This Tent is to be dreſſed with *Ung. de Alth.* and inſerted into the Cavity of the Scrotum, where it is to remain for the Space of twenty four Hours. This prevents the Water from returning; and therefore the Tent ſhould be gradually diminiſhed, as the Cavity is contracted, and the Tumor ſhould be dreſſed with an emollient Plaſter. When a good Suppuration enſues, the Tent is to be dreſſed with *Ung. digeſt. Galeni*; and *Ung. roſat.* is to be conveyed into the Cavity of the Scrotum. In about ſeven Days Time the Tent ſhould be dreſſed with *Unguent. Hyperic. Comp.* the Sinus is to be cleanſed, and the Wound incarned and healed, keeping the Patient to a proper Regimen. Much the ſame Practice was alſo deſcribed before that Author by RUYSCH [b], who ſays, the Scrotum is to be opened in its upper Part on one Side, inſerting an oblong Tent, dreſſed with *Ung. roſac. cum Merc. præcip. rub.* till a gentle Inflammation follows, attended with a mild Suppuration; whereby the Membranes, in which is the Seat of the Diſorder, will be digeſted off, and ſhould be extracted with a *Tenacutum:* by which Method I have known many obtain a perfect Cure. But it ſhould be obſerved, that the Practice theſe Authors recommend, will ſucceed only when the Teſticle is ſound. For if we are aſſured, or may reaſonably ſuppoſe it vitiated, it will be more adviſeable to follow the firſt or ſecond of the Methods here deſcribed, for performing the *Curatio perfecta.*

Another Method.

X. There is ſtill another Method practiſed by itinerant Medicaſters; by which they make an Inciſion in the Inguen, and tearing the Scrotum off the Teſticle, they extirpate it together with the Proceſs of the Peritonæum, notwithſtanding both of them are in a ſound State: as they alſo do in the Enterocele, which we before obſerved. But I think they ought to be ſeverely repre-

[a] *Prattica della principali operazioni, &c.* P. 230.
[b] *Adverſar. Anatom.* Dec. II. 22.

hended

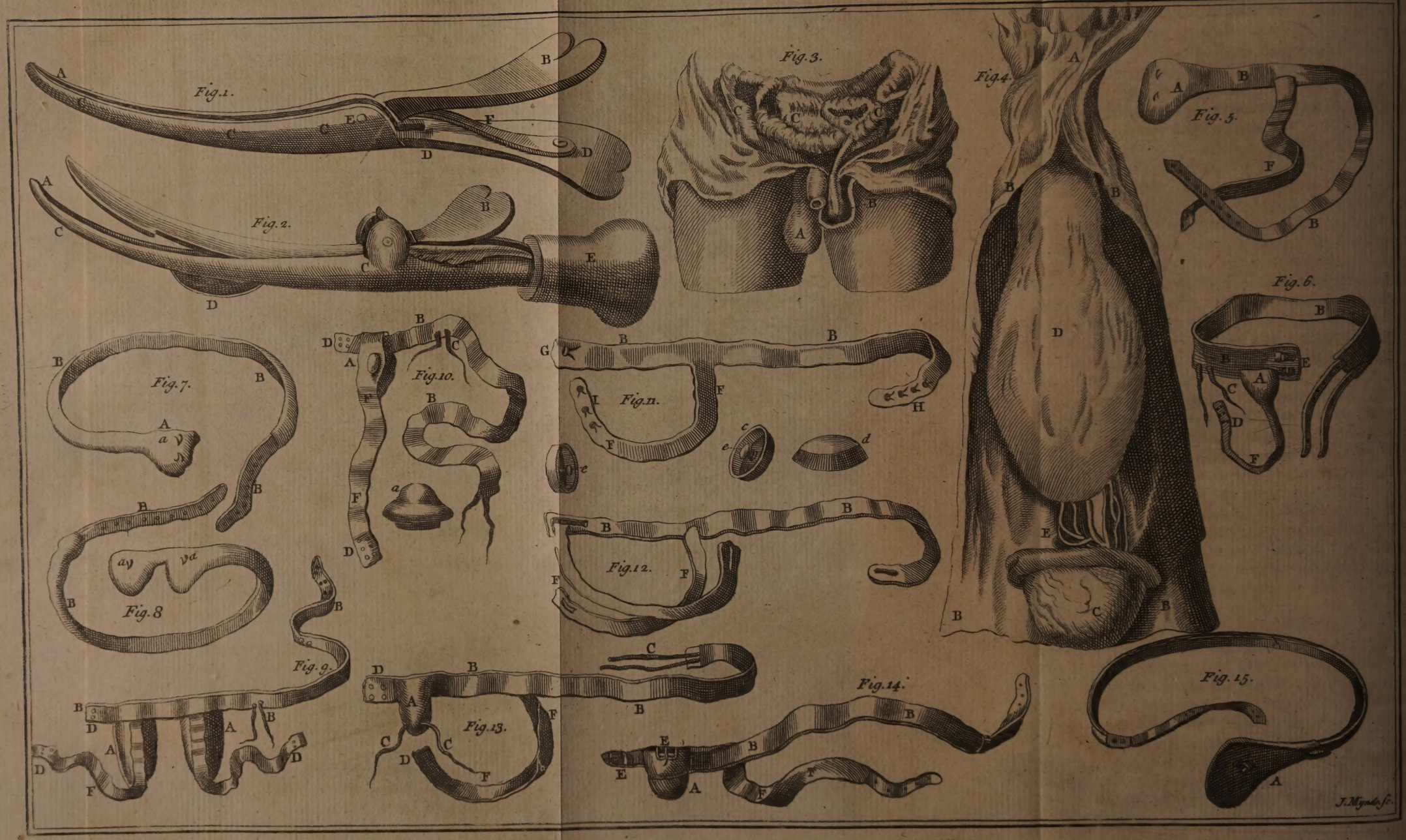
Fig. 1.
Fig. 2.
Fig. 3.
Fig. 4.
Fig. 5.
Fig. 6.
Fig. 7.
Fig. 8
Fig. 9.
Fig. 10.
Fig. 11.
Fig. 12.
Fig. 13.
Fig. 14.
Fig. 15.
J. Myndy sc.

hended, and punished for their Barbarity and Male-practice. But if the Testicle is scirrhous, their Practice may be right: yet they ought to proceed in a more cautious and gentle Manner; as we advised *Chap.* CXXI. *Sect.* IV. To conclude, the *Curatio perfecta* will succeed best in young and robust Patients: but for those who are infirm, and advanced in Years, the *Curatio palliativa* may suffice: but in either Case, the Surgeon should be extremely careful not to mistake an Enterocele for this Disorder; lest he should wound the Intestine, to the Destruction of the Patient.

An EXPLANATION *of the* TWENTY FIFTH PLATE.

Fig. 1. Represents a concealed Scalpel or Bistory for dilating the Parts in Ruptures (in French *Bistouri herniaire cachée)* which is also recommended by some, as well for cutting *Fistulæ* of the Anus, as for incarcerated Ruptures. A, the Scalpel concealed in the Groove, CCC, till elevated to divide the Parts by depressing the Handle B. DD, the Handle of the whole Instrument; E, the Screw or Hinge, about which the Scalpel and Handle are moved. F, the Spring that returns the Scalpel again into its Groove, when the Handle B is not depressed.

Fig. 2. Is the preceding Instrument, or *Scalpellum Herniarium*, a little improved. AB, the Scalpel elevated out of its Groove CC; D, a flat Plate, in form of a Heart, to depress the Intestine, that it may not rise above the Scalpel, and be wounded. E, the Handle, somewhat different from the former, as is also the Hinge and Spring.

Fig. 3. A, represents the Scrotum, moderately distended on the right Side, by an Enterocele. B, shews the Manner in which the Intestine CCC prolapses, and is reduplicated in the Scrotum, which is here divided. The Figure is taken from BERENGERE's *French* Treatise on Ruptures.

Fig. 4. From the *Chirurgia* of PALFINUS. A, exhibits the upper Part of the Process of the Peritonæum, nor yet denudated in the *Inguen*, but laid bare by a Knife in its lower Parts BBBB. C, denotes the Testicle, and E, its spermatic Vessels; D, represents the Sacculus, being a Distention and Elongation of the interior Coat of the Peritonæum, formed by a Prolapsion of the Intestines, Omentum, or both, which are here extended almost down to the Testicle.

Fig. 5, 6, *&c.* to 15. Represent various Kinds of Trusses, to compress the Parts, and prevent a Relapse of the Intestine, when the Rupture has been reduced. Some of these *(Fig.* 6, 12, and 13.) are made of Callico, for Infants, or of Leather for Adults. Others *(Fig.* 5, 7, 8, and 15.) are made of Steel covered with Leather. Some are made of steel Plates joined by Hinges, so as to be flexible and more easy, as in *Fig.* 15. Some are designed for Ruptures on both Sides, as *Fig.* 8, and 9. Some are for Ruptures on the right Side, as *Fig.* 6, and 7. Others for the Left, as *Fig.* 5, 10, 13, 14, and 15. Some are fastened upon the Body by tagged Laces, as in *Fig.* 9, 10, 13. Others by Straps and Buckles, as *Fig.* 6, 9, 13. Others by Hooks and Eyes, or Hooks and Straps, as in *Fig.* 5, 7, 8, 15. And others again, by different Contrivances, as in *Fig.* 11, 12. A, denotes the Bolster or Compress in each Truss,

which is applied to the Ring of the abdominal Muſcles, after the Rupture has been reduced. BB, the Girdle or Belt of the Truſs, to be faſtened round the Body, either with Strings CC, paſſed through the Holes DD, or by Straps and Buckles, as in *Fig.* 6, and 14, EE; or with Hooks, as in *Fig.* 5, 7, 8, 15, aa. In many of theſe Truſſes there is a depending Girt, beſides that which paſſes round the Body, which is to be paſſed between the Legs of Women, and faſtened to the oppoſite Part of the Belt, as FF, in *Fig.* 5, 6, 10, 11, 12, 13, and 14. In *Fig.* 10. is ſhewn the Bolſter a. In *Fig.* 11. may be ſeen a wooden Bolſter cd; ee, the Button, by which it is faſtened to the Truſs; d, the convex Part, to be applied to the Rupture. There are many more Truſſes of various Forms, contrived by ſuch as make it their Buſineſs: but I have here only endeavoured to repreſent the beſt of them.

CHAP. CXXIII.

Of the HÆMATOCELE.

Hæmatocele deſcribed.

I. AN *Hæmatocele*, or *Hernia Cruenta*, is when the Scrotum is diſtended with Blood (alone or mixed with Lymph) inſtead of Water. This Diſorder has been obſerved, not only by myſelf and ſeveral other Moderns; but it has been alſo taken Notice of by the ancient CELSUS[a], among the *Latins*, and PAULUS[b], among the *Greeks*. Hæmatocele ſhews itſelf with the ſame Signs as the *Hernia Aquoſa* preceding: but if the Scrotum be viewed againſt a Candle, it does not appear pellucid, like that, but dark and opaque, or blackiſh. A ſtill ſurer Sign is, when in perforating the Scrotum by the Trocar or Knife, to diſcharge the Humours, Blood, or a bloody Lymph flows out inſtead of the Water.

Cauſe.

II. The uſual *Cauſe* of this Diſorder is ſome external Violence, whereby the ſmall Veins in the Scrotum are contuſed, lacerated, or burſt, ſo as to extravaſate their Blood into that Cavity. If it continues long in the Scrotum, it muſt neceſſarily putrify, and diſorder the Teſticle; from whence grievous Symptoms are to be feared.

Cure.

III. The beſt Method of treating this Diſorder for a Cure, is to open the whole diſordered Side of the Scrotum by a longitudinal Inciſion, to diſcharge the bloody Humours. After the Wound has been well cleanſed, if the Teſticle appears ſound, it may be immediately healed up again with ſome vulnerary Balſam. But as the ſpermatic Veſſels are not corrupted ſo high as the Abdomen, a Ligature ſhould then be made about thoſe Veſſels in the Inguen, and the morbid Teſticle is to be extirpated as we have before directed.

CHAP. CXXIV.

Of the Hydrops Scrotalis and Pudendi.

THE *Pudenda* in both Sexes are often ſubject to dropſical Swellings, from a Laxity of the Parts and Redundancy of Water in the Blood, which in-

[a] *Lib.* VII. *Cap.* 19. [b] *Lib.* VI. *Cap.* 62.

ſinuating into the cellular Membrane next the Skin, makes it retain the Print of one's Finger, and ſometimes almoſt buries the Penis. When the Scrotum is chiefly affected, the Water is lodged between its external Coats, and particularly in the cellular Membrane, which diſtinguiſhes the Diſorder from an Hydrocele. Sometimes the *Pudenda* alone are inflated with an hydropical Tumor; but it more frequently accompanies an *Anaſarca*, or dropſy of the whole Habit: in which Caſe a Cure can be hardly expected, until the general Diſorder is firſt relieved. But when the Caſe is only partial, the diſcutient and corroborating Medicines, which we propoſed in the Hydrocele, will be found of great Service; if uſed both externally and internally, and aſſiſted with a proper Regimen. Great Benefit will ariſe to the Patient from a repeated Application of warm Compreſſes, dipt in *Aq. Calc. & S. V.* with the other Applications recommended in a ſpurious *Œdoma*, *Part* I. *Book* I. *Chap.* XVIII. GARENGEOT thinks nothing better in this Caſe, than to ſcarify the Part, and apply *Emplaſt. Norimbergenſ.* full of ſmall Perforations, to give a Paſſage to the Water: for which Purpoſe, *Emp. de Cumino*, *& diaphoretic. Mynſichti* may be alſo uſed. The Scarification may be repeated at Diſcretion, as the former grows dry. And if Scarification be not ſufficient of itſelf to diſcharge the Water, a Kind of Seton may be made in the moſt depending Part of the Scrotum, according to the Direction of DEKKERUS, in *Exercitationibus Practic.* pag. 290. An Inſtance of the Scrotum being perforated with Succeſs in this Diſorder, may be alſo ſeen in SCULTETUS, *Obſ.* 67.

CHAP. CXXV.

Of the HYDRO-SARCOCELE

AN Hydro-ſarcocele may be diſcovered and diſtinguiſhed from a ſimple Hydrocele, by perceiving a fluctuating Humour about the hard Body of the Teſticle; or by finding the Teſticle preternaturally enlarged and indurated, after the Water has been diſcharged. It is not eaſy to diſtinguiſh the Hydro-ſarcocele from the ſimple Hydrocele, while the Scrotum is diſtended with Water: for, unleſs the Water be very ſmall in Quantity, the Teſticle cannot be felt by the Fingers. If the Patient is only willing to be freed from the ſuperfluous Water, that may be eaſily done, as we have directed in the *Hydrocele ſimplex*. But when the Teſticle is greatly tumified, indurated, and painful, it will be neceſſary to remove the Sarcocele, as well as the Hydrocele, in the ſame Operation. Therefore the Proceſs of the Peritonæum ſhould be firſt denudated by the Scalpel, and a Ligature made about the ſpermatic Veſſels: and after freeing the *Tunica Vaginalis*, which is continuous with the Proceſs of the Peritonæum, from the Scrotum, the diſeaſed Teſticle is to be extirpated, and the Wound treated as before.

CHAP.

CHAP. CXXVI.

Of the HYDRO-ENTEROCELE.

AN Hydro-enterocele is, when after the Inteſtine is returned into the Abdomen, there ſtill remains a fluctuating and watery Humour on the ſame Side, near the Teſticle. But when the Hydrocele is on one Side, and the Enterocele on the other, they do not make one, but two diſtinct Diſeaſes. In this Diſorder, the Inteſtine is to be firſt returned into the Abdomen, and ſecured from a Relapſe: and then the Hydrocele is to be treated either by the *Curatio perfecta* or *palliativa* preceding, according to the Patient's Inclination and Judgment of the Phyſician. There is another Method of Cure in this Diſorder, which is performed as in the Enterocele, *Chap.* CXIX. *Sect.* XII. But great Care ſhould be taken, not to open the Scrotum before the Inteſtine is returned, and prevented from relapſing by the Hand of an Aſſiſtant; becauſe, it would then be ſubject to be wounded, at the Hazard of the Patient's Life.

CHAP. CXXVII.

Of the PNEUMATOCELE, *or* HERNIA FLATULENTA.

Whether ſuch a Diſorder is ever obſerved.

I. WE are aſſured by ſeveral Authors, that the *Hernia Flatulenta*, or windy Rupture, does ſometimes occur in Practice: but it is not, in my Opinion, rendered very probable, either from Reaſon or Obſervation. I am rather apt to think, they have been miſtaken, for want of Judgment and ſenſible Demonſtration; by which Means an Hydrocele or Enterocele has impoſed on them for a Pneumatocele. And I am the more confirmed in this Opinion, becauſe the Symptoms and Cure of the Diſorder, with which they acquaint us, agree exactly with thoſe of the Hydrocele. For my own Part, I have been ſeveral Times concerned in Caſes, where the Phyſicians and Surgeons have miſtakenly ſuppoſed the Patient's Diſorder a Pneumatocele; when in Effect it has proved to be one of the fore-mentioned. Thus MEEKREN, who was no unſkilful Surgeon, intitles the LI. *Cap. in Obſ. Chirurg. De Paracenteſi Scroti in Hernia Flatulenta:* from whence the Reader might imagine, that there was in Reality ſuch a Diſorder. But if he goes through the Chapter, he will find, that Water, and not Wind, was diſcharged by the Operation.

Diagnoſis and Cure.

II. The Signs, by which thoſe Authors tell us a Pneumatocele may be diſcovered, are (1) that upon handling the Scrotum, it feels like a Bladder diſtended with Wind; and that therefore (2) it ſeems to be much lighter, than if it contained any Humour; appearing alſo pellucid at the Approach of a Candle: and laſtly (3) if it be ſtruck by a Fillip of the Finger, it ſounds like a Bladder, which is diſtended with Wind, and ſtruck in the ſame Manner. But myſelf, I could never obſerve any thing of this Diſorder, though I have cured a great Number of all the other Kinds of Ruptures: which makes me ſuſpect, at leaſt, that the Caſe does not ſo often occur, as ſome would inſinuate. But

whenever the Surgeon meets with it, he may proceed in the Cure, as follows. The Tumor may be treated externally, with the warm and diſcutient Medicines, which we adviſed in the Hydrocele; together with Fomentations and Plaſters: and internally may be taken carminative and gentle Purges. But if theſe take no Effect, and the Tumor ſtill increaſes, or continue the ſame, the Scrotum ſhould then be perforated with the Trocar, and its Contents thereby diſcharged, which will demonſtrate whether it was Wind or Water.

CHAP. CXXVIII.

Of the CIRSOCELE, *or* HERNIA VARICOSA.

I. THE ſpermatic Veins are often preternaturally diſtended, or divaricated in the Proceſs of the Peritonæum, immediately above the Teſticle, and ſometimes higher up in the Scrotum, or even in the Groin; inſomuch that they reſemble the Inteſtines of a Bird, and equal the Size of a Gooſe Quill, with *varicoſe Nodes*, or Inequalities, thicker in one Place than another: by which Means the Teſticle appears much larger, and hangs down lower than it ſhould do. And this is the Diſorder, which has been uſually denominated by Phyſicians and Surgeons, a *Cirſocele*, *Varicocele*, or *Hernia Varicoſa*; though it might have been more properly termed *Varices* of the ſpermatic Veſſels. Sometimes alſo the Veins of the Scrotum are thus diſordered, as CELSUS obſerves: but ſuch a Dilatation of thoſe Veſſels cannot be properly named a Hernia; but rather, with FABRIC. AB AQUAPENDENTE, Varices of the Veins. However, both Caſes are frequently confounded, and improperly accounted one and the ſame Diſeaſe. Varicocele deſcribed.

II. The Cauſe of either of thoſe Diſorders is uſually thought to be in the Blood; being either too redundant in Quantity, or of a too thick and gluey Conſiſtence: So that by ſtagnating in too great Quantities in thoſe Veins, it occaſions them to be thus preternaturally diſtended. Patients troubled with the Piles, and eſpecially the external, are very ſubject to this Complaint, and their Urine is often bloody. Frequently, the Diſorder alſo ariſes from ſome external Violence, whereby the Coats of thoſe Veſſels are contuſed, overſtretched, and weakened, and the Blood by that Means impeded it its Courſe. I have ſometimes alſo obſerved the Diſorder in young Men, who are very ſalacious, and overſtocked with Semen: in which Caſe, the Tumefaction has been moſt conſpicuous, at ſome Diſtance from the Teſticle, in the Scrotum. For a Quantity of Blood, much larger than uſual, being then ſent to the Teſticle, by the Artery, the Capacity of the Vein muſt, in Conſequence, be much enlarged or diſtended in Proportion. But whatever be the Cauſe of the Diſeaſe, it ſeldom gives the Patient much Trouble or Uneaſineſs. Nor is there any Neceſſity for the Uſe of Medicines, and much leſs any chirurgical Operation, except when it becomes intolerable to the Patient, by violent Pains, and other Uneaſineſs, which render it neceſſary to make Uſe of the ſubſequent Methods. Cauſes.

III. If

Medicinal Treatment.

III. If through Pain, or other Uneaſineſs, it becomes abſolutely neceſſary to try ſome Means; as in healthy Conſtitutions, the Diſorder may ariſe from a Redundancy of Semen in the ſpermatic Veins, the moſt ready and effectual Remedy will be Matrimony, which ſhould be therefore adviſed to the Patient. But if the Caſe ſhould happen to be in one already married, or that proceeds from ſome external Violence, there is but little room to expect a Cure from Medicines; as the lacerated or over diſtended Veins do but very ſeldom, by that Means, recover their former Elaſticity and Vigour. However, ſuch topical Remedies may be diligently applied, which are known to attenuate the Blood, and ſtrengthen relaxed Parts: and for internal Medicines, it may be proper to call in the Advice of ſome ſkilful Phyſician. The Surgeon in particular ſhould bleed the Patient, and try the Application of thoſe aromatic and aſtringent Fomentations, which we directed in the Hydrocele, *Chap.* 122.

Treatment by the Knife.

IV. When other Means have proved ineffectual, and the Diſorder ſtill increaſes, or continues intolerable to the Patient, the Practice of the Ancients [a] was then to paſs a Ligature about the Veſſels, or apply an actual Cautery. But as that Treatment appears too ſevere, when the Varices are in the Integuments of the Scrotum, I ſhould rather approve of opening thoſe, which are moſt diſtended, the whole length of the Tumor: and after letting them diſcharge a few Ounces of Blood, to make the Dreſſing with ſcraped Lint, a vulnerary Plaſter, Compreſs, and proper Bandage; and to treat the Wound in the ſubſequent Dreſſings with ſome vulnerary Balſam. By which Method the inſpiſſated Blood will be not only diſcharged, but the Veſſels alſo rendered more firm and ſecure from future Diſtention, by the formed Cicatrix. But if the varicoſe Swellings are in the Veins within the Scrotum; the Integuments thereof, together with the Proceſs of the Peritonæum, are to be firſt divided, to diſcover the Veſſels, which are then to be treated as before.

V. In the mean Time, the Patient is to be recommended to drink plenty of thin Liquors, uſe frequent Exerciſe, with attenuating Medicines, and to bleed, at leaſt, two or three Times in a Year. On the other Hand, he is to be forbid all groſs and ſolid Food, with a ſedentary Life, as greatly conducing to inſpiſſate the Blood, and increaſe the Cauſe of the Diſorder. The ſame Regimen ſhould therefore be directed, as well to prevent the Diſorder from growing worſe, as for the Removal of it. The Practice of ſome, when the Tumor is very painful, is to make a Ligature about the ſpermatic Veſſels and Proceſs of the Peritonæum in the Groin, and then to extirpate the Teſticle, together with the varicoſe Veins: But if the Veſſels are indurated up to the Ring of the abdominal Muſcles, the Operation ſhould be omitted: for Death is the uſual Conſequence.

[a] *Vide* FABRICIUS AB AQUAPENDENTE *Cap. de Hernia varicoſa, in Operat. Chirurg.* and CELSUS, *Lib.* VII. *Cap.* XXII.

CHAP.

CHAP. CXXIX.

Of a Cancer and Sphacelus in the Teſticle.

IF a Scirrhoſity of the Teſticle ſhould degenerate into a Cancer, or an Inflammation into a Sphacelus, or if the whole Body of the Teſticle ſhould be ſuppurated from any other Cauſe; there is then left but one, and a ſevere Remedy, to prevent the Diſorder from ſpreading up to the Inguen, and into the Abdomen, ſo as to deſtroy the Patient. But if the Teſticle be ſphacelated only in Part, it muſt not be extirpated: in this Caſe the Abſceſs ſhould be opened, cleanſed and conſolidated. And that is, to extirpate the Teſticle, in the Manner we have explained, under Celotomy, in *Chap.* CXIX. and in *Chap.* CXXI. of the Sarcocele. But the Admonition of GARENGEOT in every Caſtration is here very remarkable: *viz.* That an Inciſion ſhould be made at the Ring of the abdominal Muſcles; and, after ſeparating the ſpermatic Veſſels, a Ligature be made about them, at the Ring, or a little above it, before the Surgeon proceeds to meddle with the Teſticle: which, he ſays, will facilitate the Cure, and give the Patient much leſs Pain. But for what other Reaſon he does not ſay. I ſhould rather imagine that ſuch an Inciſion would weaken the Part, and ſubject the Patient to a future Rupture, at leaſt: to ſay nothing of the violent Pain, which the Patient muſt ſuffer from making the Inciſion and Ligature near the Ring; where, if a Ligature were to be made, there would be great Danger of Inflammation, and its Conſequences internally. If ſuch a Practice ſhould be rendered neceſſary, from the Diſorder in the ſpermatic Veſſels having reached up to or beyond the Ring of the abdominal Muſcles, I ſhould even then think it moſt adviſeable to deſiſt from the Operation, as it never ſucceeds.

CHAP. CXXX.

The Method of treating a Diſorder of the PENIS.

Of a PHIMOSIS.

I. A *Phimoſis*, ſo called from the *Greeks*, is, when the *Præputium*, or Foreſkin of the Penis, is by a violent Inflammation rendered ſo ſtrict or tenſe, that it cannot be drawn back behind the *Glans*. This Symptom ſubjects the Patient to many bad Accidents, eſpecially when it confines a virulent Matter between the *Præputium* and *Glans*. Which Matter being therefore incapable of a proper Diſcharge, as the Part cannot be cleanſed, breeds *Chancres*: and in proceſs of Time, as VERDUC obſerves, a Gangrene or Cancer, or at leaſt a violent Inflammation of the *Glans* and *Præputium*, till at length the Penis is either conſumed by thoſe corroding Ulcers, or is obliged to be ampu- Phimoſis deſcribed.

tated by the Scalpel. An *ardor urinæ*, or pain in making Water, is alſo a frequent Companion of this Diſorder, from an Eroſion of the *Glans* and *Urethra*.

II. The *Cauſe* of this Diſorder is uſually communicated by Commerce with unclean Women; whereby the virulent Matter lodged in the Sinus's of the Vagina, inſinuates itſelf betwixt the Glans and Præputium, where remaining, it occaſions an Inflammation, with the now mentioned Symptom, a Phimoſis; and poſſibly ſome of its Conſequences before enumerated. Though Inſtances are not wanting of a natural Stricture in the Præputium of this Part, in ſuch a Manner, that the Glans cannot at all or very difficultly be denudated [a]; but as the Diſorder neither obſtructs their making Water, nor the Procreation of Children, it does not require any Aſſiſtance from the Surgeon, unleſs an Inflammation or violent Pain, and Difficulty in the latter, ſhould make an Inciſion neceſſary. But then they, who have their Præputium naturally very long, are more ſubject to this Diſorder, and apt to retain the Infection than others, as we learn both by Reaſon and Experience.

Treatment of the Phimoſis.

III. If the Phimoſis does not proceed from any infectious Cauſe, it may be ſufficient only to bathe the Parts a conſiderable Time in warm Water. But if it be a venereal or foul Caſe, proper internal Medicines are to be exhibited at the ſame Time, as well as the Pain, and other Symptoms mitigated by waſhing out the virulent Matter with warm Water, and an Injection frequently repeated, *ex decoct. hord. & mel. Roſar.* To diſperſe the Tumor externally, a diſcutient Fomentation or Cataplaſm may be afterwards applied to the Penis; not forgetting to bleed the Patient, according to his Habit and the Urgency of the Inflammation. After theſe Means have been uſed ſome Time, the Surgeon ſhould endeavour to draw back the Præpuce: which if he finds to be ſtill impracticable, and the Diſorder increaſing, it will be neceſſary to perform the Operation, to avoid expoſing the Patient to greater Injuries.

Firſt Method.

IV. In this Caſe, there are two Methods of operating. The firſt is, by drawing the End of the Præputium forwards, while the Glans is held by an Aſſiſtant. The Surgeon preſſing back the Glans in the extended Præputium with the Thumb of his left Hand, divides the extended Skin of the Præpuce by the Scalpel or Sciſſars before the End of his Thumb, much in the ſame Manner as the *Jews* circumciſe their male Children. This done, the Præpuce may be turned back without much Difficulty; and the Glans being laid bare, may be cleanſed, and healed of its Chancres.

A Second Method.

V. Another Method is, to divide with a Pair of Probe Sciſſars ſo much of the Præpuce, as will ſuffice to denudate the Glans, after it has been extended as before. GUILLEMEAU, PALEYN, and others, prefer a kind of Knife for this Operation, repreſented in *Tab.* XXVI. *Fig.* 4. But what ſhould be the Reaſon of its particular Figure, and why a ſtraight Scalpel might not anſwer the Intention as well, I muſt confeſs I am at preſent ignorant. The Præpuce being thus divided longitudinally, ſome Surgeons amputate with a Pair of Sciſſars ſo much of the Extremity of the Præpuce as they think ſuperfluous. The Operation is uſually attended with a pretty plentiful Hæmorrhage, which ſhould not be ſtopped by Art, but permitted, according to the Patient's Strength, to abate the Inflammation. Then it is to be dreſſed with ſcraped

[a] A Caſe of this Kind may be ſeen in *Hiſt. Accad. Reg. Scient. Ann.* 1706. *Pag.* 31.

Lint,

Lint, and the Bandage proper for this Part. In the ſubſequent Dreſſings it may be treated like other Wounds; but ſhould not be healed too haſtily, nor cloſely, leſt there ſhould be Occaſion to repeat the Operation. When the Præpuce has been thus divided, the Glans is ſometimes drawn down by the Frænulum, ſo as to incurvate the Penis: in which Caſe, it may be proper to divide the Frænulum with a Pair of Sciſſars. If an incipient Mortification has ſeized upon the Glans, it will be neceſſary often to ſcarify the Parts affected, down to the ſound Parts, and apply a Fomentation of *Ægyptiac. & Theriac. in S. V. Camphorat. ſolut.* which ſhould be continued, till the Gangrene diſappears. But if there ſhould be any of thoſe little obſtinate Ulcers called Chancres, no good can be done without Mercurials internally given, and often ſo as to raiſe a ſlight Salivation; at leaſt, the Patient cannot be ſafe under any other Method. I muſt not here forget to mention an Inſtrument, contrived by my intimate Acquaintance TREW, while I was at *Altorf*, for returning back the Præpuce, without Inciſion, in a Phimoſis: ſee *Tab.* XXV. *Fig.* 5. Where the Plates AA being inſerted under the Cutis, and being gradually let out by the Screw B, do, by their Elaſticity, ſlowly dilate the Skin, till it may at laſt be turned back without Inciſion. But whether this Inſtrument will always anſwer the Expectation, I much doubt.

CHAP. CXXXI.

Of a PARAPHIMOSIS.

1. WE now proceed to a Diſorder oppoſite to the former, which is from the *Greeks* called *Paraphimoſis:* when the Præpuce, from its natural Shortneſs, or a morbid Stricture, cannot be drawn over the Glans, but remains contracted behind it. In this Caſe, it is uſual for the Glans to be not only much tumified, inflamed, and painful, from the Stricture; but the free Circulation of its Blood being thereby obſtructed, will ſhortly bring on a Mortification, which will make an Amputation of the Part abſolutely neceſſary. Thoſe are moſt ſubject to the Paraphimoſis, who have naturally a ſhort Præpuce, and are too intenſe in their Embraces with Women, who have very ſtrait Paſſages, particularly Virgins. Therefore young Huſbands, who have ſometimes this Diſorder, are greatly miſtaken, when they think it ariſes from an Infection, contracted in deflouring their Wives: when in Reality it proceeds only from the natural Shortneſs of their Præpuce, and the Stricture of Virginity. Boys are alſo ſometimes affected with this Diſorder, when they laſciviouſly draw back their Præpuce, being extremely narrow, and afterwards cauſing an Erection, it cannot be returned over the diſtended Glans; from whence I have ſeen a ſuprizing Tumor of the Præpuce behind the Glans. But I would not have the Reader hence imagine, that the Paraphimoſis does not oftner ariſe from unclean Embraces: for the Præpuce being inflamed and tumified by the infectious Matter imbibed by it, generally produces this Diſorder, when it is alſo naturally ſhort. The Paraphimoſis is by the *Germans* called, from its external Appearance, a *Spaniſh Collar*. Paraphimoſis deſcribed.

Cure.

II. The Cure of a Paraphimosis consists chiefly in returning the contracted Præpuce over the naked Glans: which done, the Pain and other bad Symptoms quickly vanish. But as a violent Inflammation is usually the chief Cause of its being so difficult to return the Præpuce in the Paraphimosis, it may be first proper for the Surgeon to make Trial of discutient and emollient Fomentations, or Cataplasms, with *Sp. Vin. Camphorat.* before he endeavours to draw the Præpuce over the Glans: which being effected, all the other Symptoms vanish in Course. However, some Surgeons prefer the Use of cold Water to *Sp. Vini Camph.* or warm emollient Fomentations and Cataplasms; because the last often augment the Influx of Blood to the Parts, and so increase the Tumor. But when the Penis, Scrotum, and lower Part of the Abdomen, are immerged in cold Water, with plentiful bleeding, the Tumor generally subsides in a short Time. The Penis is then to be held betwixt the Surgeon's two foremost Fingers of each Hand; and the Glans, having been first lubricated with Oil, or Butter, is to be forcibly pressed back with his Thumbs, while the Præpuce is, at the same Time, drawn forwards under his Fingers, so as to cover the denudated Glans: in doing this, the Patient seldom fails to make heavy Complaints, of which the Surgeon should either be regardless, or else dispatch his Work the sooner, as CELSUS advises. When the Præpuce has been brought over the Glans, there remains but little else to be done in the Case. If the Inflammation be not very large, it may be often sufficient only to bathe the Parts in warm Water, when there is little or no Virulency; if the Patient be treated in other Respects, as we before directed.

Treatment of a malignant Paraphimosis.

III. But if the tumified Penis tends to mortify, through the Violence of the Inflammation, or long Continuance of the Disorder; it will be most adviseable to bleed the Patient first in the Arm, and then in the *Vena dorsalis Penis:* in which last, it should be continued till the Tumor subsides, and then the Præpuce may be drawn over the Glans, as before. PETIT's Method in the Paraphimosis, is to compress the Glans by a strict Bandage, passed one Part through the other, like the uniting Bandage: and when it is sufficiently contracted, he reduces the Præpuce over it, as before. Sometimes the Præpuce is so much distended with the serous Part of the Blood, that it appears like a Blister raised by Fire, or a Vesicatory, seeming very pellucid, and transparent to the Eye of the Spectator, and much obstructing the Reduction of it over the Glans. In that Case, it may be proper to make a few Punctures, with a Lancet or Scalpel, to discharge the distending Lymph; and after washing the Parts in warm Wine, the Præpuce is to be extended over the Glans as before. But to prevent the wounded Præpuce from growing to the Glans, as it otherwise may; the Surgeon should direct the Patient to frequently draw it backward and forward, and to wet his Glans over with his Urine, when he makes Water, which he should continue, till there is no farther Danger of their adhering together. The same Intention may be also answered, with equal Advantage, by frequently washing the Glans, and internal Surface of the Præpuce with warm Wine, or by interposing soft Lint. But if by Accident, or Neglect, there should be such a Cohesion of the Glans and Præpuce, it ought to be immediately separated by the Lancet, or a proper Scalpel; but with great Caution, for fear of wounding the Glans, which would induce a large Hæmorrhage. This Caution of keeping the Glans and Præpuce free from each other, while

they are ſo, is the more neceſſary, as it is with the greateſt Difficulty, that they can be afterwards ſeparated, when they are once firmly united. The Operation being finiſhed, the Penis is to be bound up to the Abdomen; leſt, if it ſhould hang pendulous, the Inflammation and Tumor might return, at leaſt in Part. I remember, more than once, to have ſeen the tumified Præpuce, behind the Glans, ſo much indurated, that the Hardneſs could never after be removed.

IV. When all the preceding Means prove ineffectual, M. PETIT's Method of proceeding is to incite the diſtended or contracted Præpuce, by inſerting a ſmall and crooked Scalpel, with the Edge outward, and the Back towards the Glans. And thus he divides the Præpuce by Inciſion, in three, four, or more Places, according as the Degree of Diſtention may make it neceſſary. And after waſhing the inciſed Parts in warm Wine, and reducing the Præpuce over the Glans, covered with a little ſoft Lint, the Penis is then bound up, and treated as before. PETIT's Method.

CHAP. CXXXII.

Of a CANCER *and* SPHACELUS *in the* PENIS.

IF a *Gangrene*, or incipient Mortification in the Penis, ſhould ſucceed a Phimoſis or Paraphimoſis, it ſhould be treated, as we have directed in *Chap.* CXXX. N°. 3. But if a *Sphacelus*, or confirmed Mortification, or a *Cancer*, ſhould infeſt the Penis, after a Scirrhoſity of the Glans, the morbid Parts are, in that Caſe, to be immediately divided from the reſt, to prevent the Diſorder from ſpreading into the adjacent ſound Parts, to the Deſtruction of the Patient. To perform this, the following is the moſt convenient Method. Firſt, a ſmall Cannula, or Tube of Silver, or Lead, a little longer than the Part affected, is to be introduced into the Urethra, ſo as to paſs a little way beyond the unſound Part, which is to be divided. Then a ſtrict Ligature is to be made with Thread or Silk in the Sound, immediately behind the diſeaſed Part of the Penis, in the ſame Manner as in removing Tubercles and Wens, or fleſhy Excreſcences by Ligature. The inſerted Tube, in the mean Time, is to be ſo firmly ſecured in the Urethra, that it may not fall out, or be diſplaced, but afford a free Paſſage to the Urine. The Ligature is to be thus left upon the Penis for ſeveral Days, until the Part diſeaſed is thereby ſeparated, and falls off: but if the Ligature ſhould ſlacken in the mean Time, it may be made tighter every Day. I am not ignorant, that it is the Practice of ſome Surgeons to amputate the diſeaſed Part, before there is a ſpontaneous Separation made by the Ligature, and then to ſtop the Hæmorrhage with an actual Cautery or aſtringent Medicines [a]: by which Method ſome Patients have, indeed, been happily cured. But as ſuch a Practice ſeldom ſucceeds well, being uſually followed with malignant Symptoms, the Ligature, in my Opinion, ſeems to be much more preferable. It may be alſo obſerved here, that when a conſiderable Part of the Penis is left ſound and entire, the Patient may be ſometimes

[a] Such is the Practice of SCULTETUS, *Obſ.* 65.

capable

capable of Procreation afterwards, more or leſs, in Proportion to the Length of the Part remaining. Thoſe who are deſirous of ſeeing ſome Inſtances of this Diſorder, may read SCULTETUS, *Obſ.* 60. and 65. HILDANUS, *Cent.* III. *Obſ.* 88. and RUYSCH, *Obſ.* 30: but particularly DOEBELLIUS, who has wrote expreſly on the Diſeaſe, in a Treatiſe, publiſhed under the Title of *Relatio de Cole a cancro infecto, ſed per adhibitum ferrum feliciter curato. Lipſiæ, Anno* 1698. 12°. *cum figuris.*

CHAP. CXXXIII.

The Manner of dividing the Frænulum of the PENIS.

THIS Operation is neceſſary, when the Glans is drawn down in ſuch a Manner by the Frænulum, that the Penis is thereby incurvated, ſo that it cannot be properly erected, and therefore renders the Patient incapable for Procreation[a]. The Operation may be alſo equally neceſſary, when the Penis is after the ſame Manner incurvated in a Clap, Phimoſis, or Paraphimoſis, as we have before obſerved. In both Caſes, the Frænulum of the Penis may be cautiouſly divided, either with the Sciſſars or Scalpel, almoſt in the ſame Manner, as we directed for dividing the Frænulum of the Tongue. After the Inciſion, the Wound may be dreſſed with ſcraped Lint, and the Penis bound in its natural Poſture with Paſteboard or Splints. But ſometimes the Penis is ſo incurvated, that it cannot properly be erected, notwithſtanding the Frænulum is ſufficiently looſe. But that proceeds from a Miſ-conformation of the internal Parts of the Penis; and is therefore very difficultly, if at all, curable. If ſuch Men are deſirous of entering into a State of Matrimony, and becoming Fathers of Children; and for that End require the Aſſiſtance of the Surgeon: he may try what can be done, by the Application of Emollients to the contracted Side of the Penis, and of Aſtringents to the other Side; aſſiſting both with a proper Bandage, and ſometimes by making ſmall Inciſions in the Integuments of the contracted Side.

CHAP. CXXXIV.

Of Warts, and other Excreſcences of the PENIS.

THE ſeveral Tubercles and Excreſcences, which infeſt the Penis, are almoſt conſtantly the Effect of ſome venereal Diſeaſe preceding. The Seat of them is various. Some ariſe in the Præpuce, others in the *Corona Glandis*, and others upon the Body of the Glans itſelf. The Generality of them reſemble a fungous or ſpongy Fleſh, and are very ſpeedy in their Growth; being ſometimes painful, and often not. The fitteſt Medicines for removing them are gentle Eſcharotics, as *pulv. Sabinæ*, either alone, or mixed with *Alum. uſt.* &

[a] See HILDANUS, *Cent.* III. *Obſ.* 54.

Merc.

Merc. præcip. rub. with which it may be ſufficient to ſprinkle the Part a few Times: or it may be mixed with *Ung. Baſilic.* or ſome other digeſtive Ointment, and then applied. If any of the Tubercles appear harder than ordinary, they may be gently touched every Day with *Lapis Infernalis*, till they are perfectly deſtroyed. If the Tubercle adheres by a ſlender Root, it may be conveniently taken off, either by the Sciſſars or Ligature, as we before adviſed, in removing other Warts and Tubercles. If the Excreſcence has too broad a Baſis to be conveniently removed by Ligature, with a hard and callous Apex; the Top of it only may be taken off with the Sciſſars; and after letting it bleed a while, and waſhing it with warm Wine, the Remainder may be taken down with *Lapis Infernalis*, as before. But the Method of deſtroying them by the actual Cautery, propoſed and uſed by SCULTETUS (*Obſ.* 65.) and FABRICIUS AB AQUAPENDENTE, is, in my Opinion, a Practice much too ſevere. To conclude; the Patient ſhould, in the mean Time, be treated with proper internal Medicines, to carry off the contagious and virulent Matter of the venereal Diſeaſe: otherwiſe, notwithſtanding their Removal, they will ſoon after break out upon the Patient again.

CHAP. CXXXV.

The Method of opening the imperforated GLANS *or* URETHRA.

How to perforate the Glans in Infants.

I. THERE are uſually two Caſes, in which, the Glans or Urethra being impervious, ſhould be opened by the Hand of the Surgeon: *Viz.* (1) when the male Infant is thus born; and (2) in a Coalition of the Extremity of the Glans in Adults, when they diſcharge their Urine behind it. We may conclude, that the Urethra is impervious in Infants, if we find no Urine diſcharged for the Space of ſeveral whole Days after the Birth; the Infant, in the mean Time, being conſtantly uneaſy, and crying. This, as ſoon as diſcovered, ſhould be timely opened by Inciſion, to ſave the Life of the Infant, which would otherwiſe be certainly loſt in a ſhort Time. The Apertion is to be made differently, according to the particular Diſpoſition of the Parts preternaturally joined. For ſometimes the Præpuce is cloſed: at others, where it is open, there appears ſome Veſtigia of the Urethra, and the Retention proceeds only from a thin Membrane. In the firſt Caſe, the Præpuce is to be treated after the Manner of the *Jews:* in the laſt, the Cure may be eaſily performed by a careful Diviſion of the Membrane with a Lancet, or the Needle before deſcribed (*Tab.* XVII. *Fig.* 5. or 6.) for couching a Cataract. When the Urine has been thus diſcharged, a ſmall Tent dipt in *Ol. Amigd. dulc.* and faſtened to a Thread, may be inſerted into the Parts divided, or a Bit of ſmall Wax-candle may be introduced, and retained in the Urethra, to keep the Parts open. If the Membrane, which obſtructs the Urethra, is of a more thick and fleſhy Subſtance, the Perforation may be better made with the ſmall triangular pointed Bodkin, or Trocar, like that repreſented in *Tab.* XXVI. *Fig.* 6. which may anſwer the Intention beyond either a Lancet or the Cataract Needle: and then the Parts are to be alſo kept open, as before. But if there are not the leaſt Veſ-

tigia, or Appearances of the Urethra, to be obſerved in the Glans of the Infant; it is a deplorable Caſe, which is commonly deſerted by the Surgeon, as incapable of any Relief. But, in my Opinion, it is better to try a hazardous Operation in a difficult and dangerous Caſe, whereby there may be ſome Proſpect of a Recovery, than wilfully to neglect the Patient, and leave him to certain Death. I muſt therefore commend the Practice of thoſe, who in this Caſe alſo, perforate the Glans with one of the preceding Inſtruments; eſpecially when the Urethra appears diſtended behind the Glans. And thus a new Paſſage can be made, and kept open with a Tent, or Wax-candle, as before. If the Operation does not ſucceed, ſo as to give the Urine vent this way, there is then no Means left: but either the Infant muſt be given over to Death, or the Bladder muſt be opened above the *Os Pubis*, or below *in Perinæo*, as we ſhall preſently deſcribe in the Chapter on the Puncture of the *Perinæum*. But whether this laſt Operation was ever performed for this Diſorder in Infants, I am not certain.

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ts.

II. There are alſo ſeveral Caſes, in which the Aſſiſtance of the Surgeon may be neceſſary, to make a Paſſage through the impervious Glans of Adults. Sometimes the Urethra is indeed pervious; but in ſuch a Manner, that the Urine does not paſs at the End of the Glans, but rather in ſome Part of the Penis behind the ſame, at various Diſtances from the Glans, even ſometimes diſcharging itſelf to the *Perinæum*. Sometimes the Urine is diſcharged by two Apertures [a], one in the Glans, and another in ſome Part of the Urethra, behind the ſame; which is generally a native Diſorder, from a Miſ-conformation in the Womb, and grows up with the Patient from the Time of Birth. Though it muſt be owned, that it may ſometimes ariſe from an Ulcer or Wound in the Penis, which penetrates into the Urethra, either by cutting out a Stone in that Canal, or to make way for the Urine, which is retained by a Calculus there: in which Caſe, a Paſſage is ſometimes made naturally by an Ulceration from the Calculus, and Acrimony of the Urine. Theſe preternatural Apertures in the Urethra are all of them very difficult to cure; the more ſo, as they are larger, and nearer the Bladder: and if the Opening be very large, there is no Poſſibility of healing it. Thoſe who have their Penis perforated in this Manner, very near the Abdomen, are abſolutely unfit for Matrimony, and incapable of propagating their Species: but thoſe are not ſo, who have this Perforation about the Middle, or towards the Extremity of their Penis. Theſe laſt may indeed celebrate the Rites of the Marriage-bed, in all Reſpects, ſo as the moſt ſubtle Parts of the *Semen* may have an Opportunity to paſs into the *Uterus* [b]. A Surgeon ought therefore to be very circumſpect, in paſſing Judgment upon Caſes of this kind, with Regard to Impotency and Divorce, before a Court of Judicature. If the Urine has a free Paſſage through ſome Part of the Glans, though it be not in its right Situation, there will be no Neceſſity for the Operation, which may be of dangerous Conſequence to the Patient, by wounding the Glans: which, if it does not inflame, is always attended with a profuſe Hæmorrhage. But if the *Urethra*

[a] A Caſe of the *Meatus urinarius* opening betwixt the Back of the Glans and the Præpuce, may be ſeen deſcribed by RUYSCH, *Theſaur. Anat.* VIII. *Pag.* 21.

[b] PAULUS (*Lib.* VI. *Cap.* 54.) adviſes to amputate the Glans in this Caſe.

has

has an Opening, either behind the *Glans* or the *Frænulum*, there are then two Things requiſite to be performed by the Surgeon: (1) To make a decent Perforation through the Glans, as we before directed; and (2) to agglutinate and heal up the morbid Opening.

III. There are two principal Methods of perforating the Glans, which we ſhall here briefly deſcribe; deſignedly omitting thoſe, which are leſs commodious, and therefore not worth our Notice. The firſt way of operating is to divide the Urethra by a longitudinal Inciſion with the Scalpel, begun at the morbid Opening, and continued through the Glans, ſo as to lay the *Corpora Cavernoſa* bare, without wounding them. The wounded Parts ſhould be permitted to bleed plentifully, in proportion to the Patient's Strength and Conſtitution, in order to prevent a future Inflammation in them: after which, if the Hæmorrhage does not ceaſe ſpontaneouſly, the Wound may be filled pretty tight with dry Lint, and the Dreſſing compleated with Plaſter, Compreſs, and Bandage. In about four and twenty Hours Time after the Operation, the firſt Dreſſings may be removed, and a poliſhed leaden Tube inſerted, ſo as to paſs through the Glans into the Urethra, beyond the morbid Opening; which is to be there continued till the Cure is compleated, for the Extramiſſion of the Urine. The callous Lips of the morbid Opening are then to be gradually removed, by repeated Scarifications, or rather by amputating them with a Pair of thin Sciſſars: for the thinner the Blades of the Sciſſars are, the more eaſily do they divide the Parts, and diſpoſe them to a more ſpeedy Agglutination. The union of the wounded Parts may be alſo greatly promoted, by keeping them together with ſome Pieces of ſticking Plaſter. But the Body of the Penis ſhould not be bound ſo ſtrict, as to intercept the Blood's free Circulation, which would cauſe it to tumify; nor ſo ſlack, as to let the Lips of the Wound recede from each other. The Dreſſing is next to be compleated with Plaſter, Compreſs, and Bandage; and the Cannula ſecured, that it may not be moved out of its Place: to prevent which, the Patient ſhould be directed to be quiet in Bed, and adviſed to abſtain from Drink for a few Days, leſt by frequent making Water the Cure ſhould be retarded, if not fruſtrated, and by the Urine inſinuating through the Wound, at leaſt give the Patient great Pain, and prevent the Plaſters from ſticking. Nor ſhould the Dreſſings be taken off, without urgent Neceſſity, during the firſt three or four Days: and even then, they ſhould be removed with great Tenderneſs and Circumſpection, to avoid ſeparating the Lips of the Wound, which are as yet but ſlightly cloſed. If the Wound be once perceived to unite, the ſame Plaſter ſhould ſtill be continued on for a few Days longer: otherwiſe, a freſh one may be applied, and the Parts retained more cloſely together; compleating the Remainder of the Cure, as we have often directed before, in other Wounds.

First Method of operating.

IV. The other Method of perforating the Glans, is by directing the ſharp triangular pointed Bodkin or Trocar (*Tab.* XXIV. *Fig.* 2. or *Tab.* XXVI. *Fig.* 6.) through the proper Part of the impervious Glans into the Urethra, and letting the Wound bleed as before. A long and ſlender Tent of ſcraped Lint is to be introduced, and the Part dreſſed up, to prevent farther Hæmorrhage: which being ſtopped, the Perforation may be kept open with a Piece of Wax-candle, as in the preceding Method. The next Day may be inſerted a

Second Method.

freſh Tent, with ſome digeſtive Ointment, or Oil of ſweet Almonds; but with this Caution, that it be not preſſed beyond the old Orifice, ſo as to prevent the Urine from being thereby diſcharged, when there is Occaſion, before the new Paſſage is cicatrized: for otherwiſe, by paſſing into the new Wound, it would give great Pain to the Patient, and much retard the Cure. The Urine ſhould be therefore permitted to paſs through the old Courſe, till the new one is cicatrized: to promote which, a Piece of Wax-candle is to be introduced, and dreſſed twice a Day with ſome deſiccative Ointment. The new Paſſage through the Glans being thus cicatrized, the old one may have its callous Lips ſcarified, or amputated, and then ſtrictly retained together, until they are united and healed upon the leaden Cannula, as before: after which, extracting the Cannula, the Cure is compleated. Sometimes the old preternatural Opening is ſo callous, and obſtinate, as not to heal by any means. But even then, perforating the Glans, in this Manner, is not without its Advantages: for the Patient will be hereby rendered much more able to ſucceed in his conjugal Function; as a great Part, if not all the Semen, will be more perfectly directed into the Uterus. And thus ſome may be happily ſupplied with a deſired Progeny, who have been many Years ſterile, by this preternatural Defect. But there is one Obſervation very neceſſary, during the Cure of this Diſorder; and that is, to bleed the Patient at Intervals after the Operation, eſpecially when he is of a robuſt and full Habit: otherwiſe, the Patient is in Danger of having an Erection, which may lacerate the Lips of the Wound newly cloſed, and undo the whole Work.

Concerning the Suture and Cauſtics in this Diſorder.

V. I am not unacquainted, that ſome Surgeons prefer ſtitching together the Lips of the wounded preternatural Aperture; and that others are for removing the Calloſity of them, rather by Cauſtics than by Inciſion. But neither of thoſe Methods can well be approved of in a rational Practice. For the Stitches of the Suture breaking out, as they uſually do, will rather enlarge the Wound than unite it: and the Uſe of Cauſtics here will be condemned by every body acquainted with their uncertain Operation, the Structure of the Part, and the great Pain or Inflammation they may this way bring upon the Patient.

CHAP. CXXXVI.

The Method of curing an Incontinency of URINE *in Males.*

Cauſe and Treatment of the Diſorder.

I. THE Neck of the Bladder is ſometimes ſo much weakened in many of the male Sex, that they are thereby rendered incapable of retaining their Urine, often diſcharging it involuntarily, either ſleeping or waking, attended with many other Inconveniencies. This Incontinency may proceed from two Cauſes, which are not unfrequent: *Viz.* (1) a Stone in the Bladder; or (2) a relaxation or paralytic Affection of the *Sphincter Veſicæ*. When the Diſorder proceeds from a *Calculus*, there is no Remedy but Lithotomy, or an Extraction of the Stone. Nor is it often curable by Lithotomy, in as much as that Operation is frequently the Cauſe of the very Diſorder itſelf. But when it ariſes from a Weakneſs of the Sphincter, the moſt likely Method of ſuc-

Fig. 1.
Fig. 2.
Fig. 3.
Fig. 4.
Fig. 5.
Fig. 6.
Fig. 7.
Fig. 8.
Fig. 9.
Fig. 10.

ceeding in its Removal, will be by the Uſe of corroborating, and nervous Medicines.

II. But as the Diſorder often receives no Relief from the beſt Endeavours of Phyſicians; Surgeons have therefore contrived various Inſtruments for retaining the Urine, that it might not be conſtantly dribbling, to the great Detriment of the Patient. Some are for adviſing the Patient to carry a Leather Bottle, or Bag, lined with Pitch, and of ſuch a Figure, as to lie commodiouſly between the Thighs, being capacious enough to hold about half a Pint: others are for faſtening a braſs or ſteel Pot of the like Nature, to the Penis, repreſented in *Tab.* XXVI. *Fig.* 7. which are to be emptied when near full. But thoſe Receptacles cannot be conſtantly retained upon the Part, taken off and on, and carried about by the Patient, without great Trouble and Inconveniencies. Some of our modern Surgeons have therefore invented more tight and eaſy Inſtruments, whereby the Penis and Urethra are gently compreſſed, ſo as to retain the Urine in the Bladder, and diſcharge it by Day or Night at Pleaſure, with little more Trouble than in the ordinary Way, by opening and ſhutting the little, light, and eaſy Inſtrument, called a *Yoke*, exhibited in *Tab.* XXVI. *Fig.* 8. which is lined with Leather, and taken from NUCK. One of theſe Inſtruments, ſtill more convenient, is repreſented by *Fig.* 9. which may be tightened and relaxed, according to the different Size of the Penis, having been frequently uſed with Succeſs in many of theſe Caſes, by my own Experience, and never before delineated by any Perſon that I know of.

Contrivance of NUCK and WINSLOW.

III. A kind of Inſtrument was formerly publiſhed by NUCK, and not long after by WINSLOW, for this Diſorder, being a Sort of ſteel Truſs, to be applied almoſt in the ſame Manner as in Ruptures, which we have repreſented from NUCK, in *Tab.* XXVI. *Fig.* 10. It is to be faſtened to the Body, ſo that the Bolſter F may compreſs the *Urethra in Perinæo*. Thus by turning the Screw D, the Urethra may be compreſſed or relaxed, and conſequently the Urine diſcharged or retained at Pleaſure. But though I am not for rejecting this Method altogether, I cannot but approve of the Yoke, as much more eaſy and commodious, of which I have often had Experience.

An EXPLANATION *of the* TWENTY SIXTH PLATE.

Fig. 1. Repreſents an *Enterocele* on the right Side, as it appears before any Inciſion is made in the Integuments, out of MAUCHART's *Diſſertat. de Hernia incarcerata Scroti*, from whence the two ſubſequnt Figures are alſo taken.

AA, The Thighs drawn aſunder, that the *Hernia* may be more diſtinctly viewed. B, the right *Inguen* diſtended by a Prolapſion of the Inteſtine. C, the ſound *Inguen* on the left Side, more plain and depreſſed than the other. D, the Penis, drawn inward, as it uſually appears in this Diſorder. EE, one Side of the *Scrotum*, very much ſtretched or diſtended from the Inguen almoſt down to the Bottom.

FF, the Bottom of the Scrotum, neither tenſe nor diſtended, in which the Teſticles may be felt ſeparate, and not confuſed with the Inteſtine. GG, the other Side of the Scrotum, in its healthy Form and Appearance. HH, the *Raphe*, or Suture, that divides the Scrotum in its Middle.

Fig. 2. Repreſents the right Side of the Scrotum laid open by Inciſion. AA, the *Cutis* divided perpendicularly, and drawn to each Side, that the included Parts may come into view.

BB, the *Membrana Adipoſa* divided, and drawn aſide, in like Manner. CC, the Ring of the oblique external Muſcle of the Abdomen; which being preternaturally dilated, admits the *Peritonæum*, or Sacculus, with its included Inteſtine, to fall through.

DD, the aponeurotic Tunic of the Teſticle called *Dartos*, which inveſts the whole external Surface of the Sacculus, including the Teſticle and Inteſtine, divided in the Middle, and ſeparating the Sacculus, which adheres to it internally, and then drawn to each Side.

E, the cellular Membrane conſpicuous betwixt the preceding and the internal *Lamina* of the *Peritonæum*.

F, the ſame cellular Membrane inflated by a Blow-pipe.

G, the internal Membrane of the Sacculus, formed by a Dilatation of the interior *Lamina* of the *Peritonæum*, immediately containing the Inteſtine, and divided in the Middle, ſo that the Inteſtine appears to Sight, marked HH.

Fig. 3. Repreſents the Situation of the Inteſtine, and other Parts in the *Scrotum*, in an *Enteroccle*, together with the internal *Sacculus Hernialis*.

A, tendinous Fibres from the *Aponeuroſis* of the oblique external Muſcles, marked DD, in the preceding Figure.

B, the external *Lamina* of the *Peritonæum*, turned a little outward, which being continued through the Ring of the Abdomen, or elongated over the ſpermatic Veſſels, is termed the Proceſs of the Peritonæum, or *Tunica Vaginalis* of the Teſticle; but when preternaturally diſtended, it makes, in Conjunction with the aponeurotic Membrane (DD *Fig.* 2.) the external Part of the *Sacculus Hernialis*.

C, the interior *Lamina* of the *Peritonæum*, preternaturally diſtended, and protruded into the *Scrotum*, forming the internal Membrane of the *Sacculus Hernialis* immediately containing the Inteſtine.

DDD, the ſame internal *Lamina* continued to the *Septum*, formed of the *Tunica Vaginalis*, which parts the Teſticle from it above.

EE, the Sides thereof drawn aſunder, to ſhew the Courſe of the ſubjacent ſpermatic Veſſels.

FF, the *Tunica Vaginalis*, looſely inveſting the Teſticle, opened, ſo as to ſhew G, the Body of the Teſticle, now covered with only the *Tunica Albuginea*.

H, the *Epididimis* upon the Top of the Teſticle.

II, the *Corpus Pampiniforme*, or Twinings of the ſpermatic Artery and Vein betwixt the external and internal *Lamina* of the *Peritonæum*, continued through the Ring of the abdominal Muſcles.

L, the Canal, which conveys the Semen from the Teſticle, called *Vas deferens*.

MM, Part of the *Inteſtinum Ileum* variouſly convoluted and included in the Sacculus of the Peritonæum, which is here removed.

Fig. 4. Is the Scalpel contrived by GUILLEMEAU, or at leaſt delineated by him, for dividing the Præpuce in a *Phimoſis*, in order to denudate the *Glans Penis*. Another Scalpel of the ſame Form, but not ſo crooked at the Point,

is

is represented by PALFYN, in his *Chirurgia*, *pag.* 176. where the Point is also armed with a little Ball of Wax.

Fig. 5. The Instrument contrived by Dr. TREW, for returning the contracted Præpuce in a *Phimosis*, without Incision: AA, are two elastic Plates, which are contracted or dilated by the Screw B.

Fig. 6. Is a small Trocar, or triangular pointed bodkin, for perforating the impervious Glans of the Penis; which may be used especially in Children, and new-born Infants.

Fig. 7. Represents the brass or steel Receptacle, recommended to be fastened betwixt the Thighs for receiving the Urine, in Cases of Incontinency. I should be large enough to hold about half a Pint. B, denotes the Mouth and Neck of the Vessel to receive the Penis, and which is to be fastened round the Body by the Ligatures cc.

Fig. 8. Denotes a steel Yoke, made of two Arms AA, covered with Leather, designed to restrain an involuntary Flux of the Urine, by compressing the Penis and Urethra. B, the Hinge, by which the two Arms AA are joined. C, a Turn-ketch to open and shut the Instrument at Pleasure. From NUCK's *Operat. Chirurg.*

Fig. 9. Is almost the same Instrument, a little improved, the Difference consisting chiefly in having a graduated Ketch c, whereby it may be contracted or enlarged at Pleasure, according to the Size of the Penis. The rest is explained by the Letters in the preceding Figure.

Fig. 10. Represents another Instrument for the Incontinency of Urine, taken from NUCK's *Operat. Chirurg. Fig.* 11. AA, the steel Girt or Belt to pass round the Body; B, the Buckle, by which the Leather Part c is fastened; D, the Screw, by which it presses against, and raises the Plate E, whose Bolster F, being defended with a Compress, is urged against the *Urethra in Perinæo*.

CHAP. CXXXVII.

Of introducing the CATHETER [a] *into the Bladder, in order to search for the Stone, or discharge the Urine, when suppressed.*

Cases in which the Catheter is necessary to be used.

I. THOUGH the passing of a Catheter into the Bladder may appear a slight and trivial Operation in the Eye of an inconsiderate Person; yet so arduous is sometimes the Task, either from an Inflammation in the Neck of the Bladder, or from certain Tubercles and Rugæ in the Urethra, or other Causes, that it even baffles the Skill of the most expert Surgeon, and is through various Impediments impracticable, even in the dextrous Hand, which is frequently versed in the Operation. There are usually two principal Causes, for which this Instrument is applied in both Sexes. The

[a] The Catheter (καθετὴρ *Galeno*, Lib. V. *Meth. Med.* Cap. V. and ÆGINETA *Lib.* VI. *Cap.* LIX.) is described by the Ancients to be a long, hollow, and crooked Tube, used in Disorders of the Bladder. And this Name was retained by the *Greeks*. But CELSUS (*Lib.* VII. *Cap.* XXVI.) calls it *Fistula ænea*, from the Metal of which it was composed.

firſt is, to be ſatisfied with Regard to the Exiſtence of a Stone in the Bladder, in as much as the other Symptoms of the Stone, ſuch as Pain in the Bladder, Suppreſſion of the Urine, a Strangury or *Iſchuria*, *&c.* are often found to be fallacious, and not to be confided in: becauſe the ſame Symptoms may ariſe from an Inflammation, Abſceſs, or Ulcer in the Bladder, from a Tumor or Excreſcence in the Neck of the Bladder, *&c.* The ſecond Caſe, in which the Uſe of the Catheter is neceſſary, is to diſcharge the Urine in an *Iſchuria*; or when the Patient cannot make any Water at all, or but very little, and with Difficulty, from ſome Defect in the Bladder, ſo that the Urine is thereby retained, until the Bladder is extremely diſtended, with violent Pain, and other bad Symptoms [a]. For if the Patient be not relieved in ſuch a Caſe, by a timely Application of this Inſtrument, the Neglect will certainly be attended with an Inflammation, Mortification, or Rupture of the Bladder, or Death will be the End, in the Extremities of Pain, Anguiſh, and Convulſions. But it ſhould be well obſerved, that the Catheter cannot be of Service in every Suppreſſion of Urine. For when that Excrement is not conveyed into the Bladder, through ſome Fault in the Kidneys, or Ureters; the Introduction of this Inſtrument muſt be evidently to no Purpoſe. Such a Caſe may perhaps receive more Benefit from the Hand of a Phyſician than a Surgeon. Nor is the Catheter to be precipitately introduced in every Retention of that Urine, before other more gentle Means have been tried: as when the Bladder has been over diſtended, by retaining the Urine too long, through Baſhfulneſs, from Cold, or any other Cauſe, in which the Patient feels a great Pain, and Tumor about the *Os Pubis*, the Tone and Contraction of the muſcular Coat of that Receptacle being thus deſtroyed, and its Neck cloſed with a ſpaſmodic Contraction. In theſe Caſes, the Uſe of the Catheter ſhould be poſtponed, until other more gentle Means have proved ineffectual: becauſe the Inſtrument cannot be conveyed through the Curve Progreſs of the Urethra, without giving much Pain and Uneaſineſs to the Patient. In this Caſe, therefore, may be applied, eſpecially in Children, *Ol. Scorpionum vel Cappar.* which is eſteemed a Secret with FABRICIUS AB AQUAPENDENTE. But I have always found the moſt Succeſs from a Cataplaſm *ex Cepis aſſatis* applied to the *Regio Pubis*. Sometimes a gentle Preſſure of the Hand upon that Part will be ſufficient to diſcharge the Urine, when it is retained from a Weakneſs or Relaxation of the Bladder. It may be alſo frequently diſcharged by Suction, with the Mouth, both in Infants and Adults. But when the Diſorder ariſes from a violent Inflammation in the Neck of the Bladder, there is often but little Service to be expected from introducing the Catheter; as the Inſtrument muſt meet with a very difficult Paſſage from the Conſtriction of the inflamed Parts, cauſing great Pain, and perhaps a Laceration or Contuſion of the tender Membranes and Veſſels by its Reſiſtance. Therefore if this Inſtrument be uſed in ſuch a Caſe, the Surgeon will have

[a] Thus HILDANUS takes Notice (*Cent.* II. *Obſ.* 65.) of a Patient, from whoſe Bladder were diſcharged ſix medical Pounds of Urine. In another old Man the Bladder was diſtended almoſt up to the Navel, and the Abdomen ſo much enlarged thereby, that he reſembled a gravid Woman. PANAROLUS (*Pentecoſt.* I. *Obſ.* 27.) found near twenty Pounds of Urine in the Bladder of another Perſon, which was diſtended up to the Navel. Many more Inſtances may be ſeen in the Writers of Obſervations.

cauſe

cauſe to fear a conſequent Increaſe of the Inflammation, with Pain, Hæmorrhage, and poſſibly a Gangrene, Mortification, and Death. Whereas if the Patient is firſt bled, and the Inflammation abated by the Uſe of Gliſters, emollient Cataplaſms, *&c.* the Catheter may then be paſſed into the Bladder without much Difficulty. The Catheter may be therefore uſed (1) whenever the Urine cannot be diſcharged, from ſome Calculus obſtructing the Sphincter, or Neck of the Bladder. (2) When the Bladder cannot diſcharge its Contents from ſome natural Weakneſs, as is frequent in old People, and in Women, from ſome Violence in their Labour, or intenſe Cold [a], when topical Remedies take no Effect. (3) When the Urine has been too long retained through Baſhfulneſs, or any other Cauſe, whereby the muſcular Coat of the Bladder is ſo much diſtended, as to loſe its contractile Force, and become too weak to expel its Contents [b]. Of which Caſe the celebrated Aſtronomer TYCHO BRAHE is ſaid to have deceaſed [c]. The Uſe of the Catheter is alſo not to be ſlighted (4) when the urinary Paſſages are obſtructed by ſome thick Mucus, concreted Blood, Matter, or putrid Membranes, which may be lodged in the Bladder, after a Wound or Ulcer in the Kidneys, or may ſtagnate in the Neck of the Bladder after making bloody Urine. And laſtly, it may be uſed (5) when the Urine is obſtructed in its Courſe, by ſome Caruncle, Tubercle, Abſceſs, or Cicatrix in the Urethra, near the Neck of the Bladder, being harder and larger than ordinary, or from an Inflammation, Scirrhus, or Abſceſs in the Proſtate, or a Tumor thereof, from any other Cauſe, ſo as to obſtruct the Urine. However, as the Catheter can never be introduced without giving a good deal of Pain and Uneaſineſs to the Patient, that ought always to be deferred, till more gentle Means have been found ineffectual.

II. But the Catheter may be introduced with much more Eaſe in Women than in Men; as the Urethra in the firſt is much ſhorter, wider, and in a ſtraighter Courſe. Though even in Women, the Inſtrument cannot be eaſily paſſed, by one that is not previouſly acquainted with the anatomical Structure and Situation of the Parts, particularly of the *Os externum Urethræ*, with regard to the reſt. For there are many ſmall *Foveæ*, *Lacunæ*, or Sinus's, at the Entrance of the *Vagina*, which may deceive the Surgeon. For the more ready finding the Orifice of the Urethra, the Surgeon is to obſerve, that it lies within the external *Labia*, in the upper Part of the Entrance of the *Vagina*, about a Finger's Breadth below the *Clitoris*, as repreſented in *Tab.* XXIX. *Fig.* 2. D, where it will appear, upon diligent Inſpection, like a ſmall and hollow Cicatrix. To paſs the Catheter into the Bladder, the Woman ſhould be firſt laid in a ſupine Poſture upon a Bed or Table, and after ſeparating the Thighs and external Labia from each other, which ſhould be held apart by the Hands of the Surgeon, or rather an Aſſiſtant, one of the ſilver Catheters [d] repreſented

Method of introducing the Catheter in Women.

[a] As is obſerved by AMATUS LUSITANUS, *Cent.* IV. *Curat.* 10. FORESTUS, *Lib.* XXV. *Obſ.* 18. and PECHLINUS, *Lib.* I. *Obſ.* 10.

[b] Examples may be ſeen in AMB. PAREY, *Book* XVI. *Chap.* 48. FORESTUS, *Lib.* XVI. *Obſ.* 25. and *Lib.* XXXV. *Obſ.* 3.

[c] By HILDANUS, *Lib. de Lithotom. Cap.* III. and more at large by GASSENDUS, *in Vita ejus*, Lib. V. p. 178.

[d] The Catheter was formerly made of Braſs or Copper, but the Moderns make it of Silver well poliſhed, as the *Arabians* did. *V.* ALBUCASIS, *Lib. Cap.* 58.

in

in *Tab.* XXVII. *Fig.* 1. and 2. or XXXII. *Fig.* 7. is to be ſlowly and carefully paſſed through the *Meatus urinarius* into the Bladder. The Size of the Catheter may be about the Thickneſs of a ſmall Gooſe Quill, and its end ſhould be firſt dipt in Oil [a]. The Inſtrument being rightly paſſed, the Wire marked A, is then to be drawn out of the Tube, and the Urine by that Means diſcharged through the Apertures B, ſuppoſing the Inſtrument to be uſed for diſcharging the Contents of the Bladder. But if the Catheter is paſſed into the Bladder to ſearch for the Stone, it is to be gently turned about, from one Side to the other, in all Directions, attending diligently to obſerve if any Sound is emitted, by ſtriking the Catheter againſt the Calculus. If ſo, there is Reaſon enough to believe the Exiſtence of a Stone in the Bladder: but if only a Reſiſtence be felt without any Sound, it may poſſibly be a Scirrhus or other Tumor. With Regard to the Catheter itſelf, ſuch are moſt approved of for Women, as are ſtraight, or but very little inflected, as that in *Tab.* XXVII. *Fig.* 1. but I do not think that very material, ſince thoſe, which are much longer, and more inflected, may be uſed almoſt with equal Advantage. I mean ſuch as are intended for Men, *Tab.* XXVII. *Fig.* 2, 3, 4, 5, and 7. When the Urine has been thus diſcharged, the Cure is often compleated, but not always. For when there is expected a ſpeedy Return of the Complaint, the Catheter is to be left in the Urethra, or elſe introduced again, till the Bladder has recovered its proper Tone or Strength to diſcharge its own Contents of itſelf. It is therefore moſt adviſeable to paſs the Catheter without any delay, when there is a Suppreſſion of Urine in Women, who have a difficult Labour; leſt their Delivery ſhould be ſo ſlow and tedious, as to diſtend and weaken the Coats, till they become paralytic, or the Nerves relaxed, ſo as to render the Diſorder ever afterwards incurable.

Method of paſſing the Catheter in Men.

III. To paſs the Catheter in the Bladder of a Male, is a Taſk much more difficult, than to paſs it in a Female Subject: becauſe in the firſt the Urethra is ſo long, narrow, and variouſly inflected, that it may well puzzle a Surgeon, who is unacquainted with the anatomical Structure of the Parts (repreſented in *Tab.* XXIX. *Fig.* 1. ABCD) and the proper Artifices which are uſed by other Surgeons in the Operation; having alſo never before made trial upon dead Subjects. Though this Operation is much better ſhewn by Example, than deſcribed by Words, we ſhall for the Sake of Beginners endeavour to explain it in the beſt Manner we are able. In the firſt Place, it will be neceſſary for the Surgeon to have a Set of Catheters of various Sizes, to ſuit different Patients; four at leaſt (tho' CELSUS *(Lib.* VII. *Cap.* 26.) thinks three of a moderate Size will be ſufficient) of different Lengths, Diameters, and Curvatures, as in *Tab.* XXVII. *Fig.* 2, 3, 4, 5. *Fig.* 2. is for a Lad of about ſix Years old. *Fig.* 3. for one of twelve Years. *Fig.* 4. for a young Man of about ſixteen. And *Fig.* 5. for thoſe who are more adult. The longeſt ſhould be, according to CELSUS, fifteen Fingers breadth, and the ſhorteſt nine Fingers breadth long, which may be a very ſufficient Proportion for the Undertaking, the intermediate ones being in Proportion. Some approve of their being very ſmall, or

[a] When I have been at a Loſs for ſuch an Inſtrument in the Country, I have often uſed a ſmall Gooſe Quill in its Stead, for diſcharging the Urine.

ſlender,

slender, thinking that thereby they have a more easy Passage into the Bladder. In this they are much mistaken: because the most slender ones are apt rather to catch and stick in the *Rugæ* and Inequalities of the *Urethra*, which often appear very considerable in old Men, so that the whole Operation may be thereby frustrated. This is confirmed with two Examples by HILDANUS[a], in which neither himself nor the Lithotomist could pass a very slender Catheter into the Bladder: but upon introducing a larger, about the Size of a Goose Quill, they found a ready Admittance. The same is also confirmed by Dr. RAW, and by my own Experience. Those are the best Catheters, which are made of polished Silver, having their Curvatures in a certain Proportion, being charged with a silver Wire AAA, to prevent them from bending in the Operation.

Method of Operation in Male Patients.

IV. To perform the Operation, the Male Patient is to be laid on his Back upon a Bed or Table. Then the Surgeon standing on the right Side, takes hold of the Penis with his left Hand, and elevates it; while with his right Hand he takes a Catheter sizable to the Patient, by the Handle C, and dipping the End of it in Oil, proceeds to apply it with the convex Part towards the Abdomen, as in *Tab.* XXIX. *Fig.* 3. gently thrusting it forward, till he has reached the Bottom of the *Os Pubis*. That done, he then gradually turns the Catheter by its Handle from the left Hand towards the Abdomen with a certain Dexterity[b], so that the concave Part of the Catheter is now towards the Abdomen, as in *Fig.* 4. Then the End of the Catheter B, is gently pressed downward under the *Os Pubis*, and then upward into the Bladder; and by drawing out the Wire the Urine enters by the Apertures BB, and flows out through the Tube. In this Manner the Catheter may be also introduced, when the Patient is standing, or sits inclined in a Chair. The Catheter may also be easily passed into the Bladder, if the Patient be laid on a Bed, and the Surgeon standing on his left Side, elevates the Penis, and a little inclines it towards the Navel; and then applies the Catheter with its concave Part towards the Abdomen, protruding it into the Urethra down to the *Os Pubis*, and so thrusting it under the Symphysis of those Bones without the artificial Turn, moving the Catheter in the Urethra, somewhat in a circular Position. This is a method much easier to be practised with Success by those, who are not versed in the Operation, than the preceding.

Another Method.

Cautions to be observed.

V. But in either of these Methods the Surgeon should proceed with Prudence and Gentleness; lest by too great Violence he should lacerate the Urethra, and thereby excite violent Pains, profuse Hæmorrhage, dangerous Inflammation, and perhaps Death itself: for I have known all these ill Consequences brought on by an unskilful Treatment in this Case. Sometimes the Patient is perfectly freed from his Complaint by the first Discharge of the Urine by the Catheter: at other times it will be necessary to repeat the Operation at certain Intervals, when the Urine cannot be voided by the Patient without. For the Cause of the Retention in the Urine is not always to be removed by the Catheter: only the most grievous Symptoms, which it occa-

[a] *Cent.* II. *Obs.* 65. *Cent.* IV. *Obs.* 65.

[b] The *French* call it *le tour de Maitre*, or the masterly Turn; because it is not easily performed by those who are not expert in it.

ſions, are hereby relieved, for the preſent; ſuch as violent Inflammation and Diſtenſion of the Bladder, Caruncles, Tumor of the Proſtate, *&c.* Thus the End of the Catheter often cannot paſs into the Bladder, from an Inflammation in its Neck: but after abating the Inflammation by bleeding, and proper Medicines, the Catheter may then be paſſed into the Bladder, which it could not before. If the Urine does not diſcharge itſelf by the Catheter, as ſoon as introduced, which ſometimes happens; in that Caſe, it ſhould be aſſiſted by gently compreſſing the Abdomen with the Hands, by rubbing it, or by Suction, by either of which Aſſiſtances the Urine will often follow. If in paſſing the Catheter, the End of it ſhould meet with ſome Obſtruction from the natural Caruncle of the proſtated Gland, which is termed by Anatomiſts *Caput Gallinaginis*; the Catheter ſhould not then be forcibly thruſt forward, ſo as to injure any of the Parts: but it ſhould rather be drawn a little back, and then gently protruded again, by which Means it will often paſs over the Obſtacle, and enter the Bladder. If a Caruncle from a Venereal Cauſe ſhould obſtruct the Paſſage of the Catheter in the Urethra, that indeed may be forcibly broke through by the End of the Catheter.

Method of ſearching for the Stone.

VI. If the Catheter be paſſed into the Bladder to ſearch for the Stone, (for which Purpoſe SHARPE recommends a ſteel Catheter) the End of it ſhould then be carefully directed to all Parts, as we before obſerved; and if, at the ſame Time that the Inſtrument meets with a conſiderable Reſiſtance, you obſerve a Noiſe, from the meeting of the two Bodies, there is no room to doubt of the Exiſtence of a Stone in the Bladder. But if that Sign cannot be found by the Surgeon, he may therefore reaſonably conclude, that there is no Stone, or at leaſt much doubt of its Exiſtence in the Bladder. If a hard and ſonorous Body ſhould have been once touched by the Catheter, after long ſearching, and the ſame cannot be eaſily met with again, it is a Sign, that the Stone is either very ſmall, or lies concealed in ſome ſmall Cavity or Cell of the Bladder, as may be obſerved in *Tab.* XXIX. *Fig.* 1. and 2. And, in this Caſe, it is better to ſearch with the Finger through the Paſſage of the Anus: by which Method you will be more certain of the Exiſtence of the Stone, and alſo of the Size and Figure of it, than you can be by the Catheter. But, if the Catheter immediately and conſtantly ſtrikes againſt a hard and ſonorous Body, it is a Sign the Calculus is very large. If the Catheter ſlides eaſily over the Surface of the Calculus from one Side to the other, it is a Sign of a ſmooth Stone. But if the Patient has ſometimes bloody Urine, and the Catheter moves over the Stone with a conſiderable Reſiſtence, it denotes the Calculus to have a rough or uneven Surface, or, as CELSUS (*Lib.* VIII. *Cap.* 26. N°. 2) terms it, *Superficies ſpinoſa.* And laſtly, if the hard Body is not eaſily moved by the Catheter, and affords a clear or briſk Sound, it is reaſonable to ſuppoſe the Calculus to be of the larger and more compact Kind. Whereas, if it appears to have no great Weight by the Catheter, and yields a dead or flat Sound, the Patient's Urine being alſo fabulous, it is then probable, as CELSUS obſerves, that the Calculus is of a more ſoft and looſe Texture. Which Obſervations are both confirmed by Experience, and the Authority of the celebrated Lithotomiſt of *Leyden*, JAC. DENYS, in his *Obſ. Chirurg. de Calculo.*

VII. But

VII. But to prevent a Renewal of the excruciating Pain to the Patient, and Trouble to the Surgeon, from repeating the Operation of paſſing the Catheter, when the Retention of Urine will follow again in a ſhort Time, either from a Contraction of the Neck of the Bladder, or from ſucceſſive Obſtructions with a Calculus, *&c.* in that Caſe, our modern Surgeons have provided a Kind of flexible Catheter, made of flatted ſilver Wire, convoluted in a particular Manner, as in *Tab.* XXVII. *Fig.* 6. to give a continual Paſſage to the Urine. This Inſtrument may be left in the Parts for many Days together, without incurring any Damage to the Patient, if it be properly ſecured or faſtened, until there is no longer any Neceſſity for its reſiding there. But as the flexible Catheter is uſually much more difficult to paſs into the Bladder than the other; it will be generally neceſſary for the Surgeon to paſs a common or rigid Catheter through the Urethra firſt, and let it reſide there ſome Time, in order to open and dilate the Paſſage, through which the flexible Catheter is afterwards to enter into the Bladder. This ſhould be done immediately after the Extraction of the other Catheter, to prevent the Parts from collapſing again. HELMONT [a] rejects Catheters made of Silver or Copper, as too ſtubborn for the tender Parts they are to enter; and therefore deviſes another, to be made of Leather, ſewed together in the ſame Form: for which Invention he much applauds himſelf, as he thinks little or no Pain will attend the Uſe of this laſt, from its Softneſs. But this, in my Opinion, ſeems to demonſtrate how little that famous Gentleman was converſant in chirurgical Operations: for the very Advantage, which he propoſes, *viz.* the Softneſs of the Inſtrument, renders it uſeleſs in the Hand of a Surgeon, as it will not thereby be able to make its Way into the Bladder. FABRICIUS AB AQUAPENDENTE alſo informs us, that he had uſed a flexible Catheter, which he had made him of Horn: and others have been made of other Subſtances. But thoſe made of Silver are at preſent in univerſal Uſe and Eſteem with the moſt expert Surgeons, as they have not only a ſufficient Strength and Reſiſtance, but will take an exceeding fine poliſh, and better receive and retain the proper Figure or Form, that is given to them, whereby they may be eaſily paſſed into the Bladder.

Uſe of the flexible Catheter.

VIII. Some Surgeons [b] think it beſt to have many Apertures in the curve Part of the Catheter, the better to facilitate the Exit of the Urine: but two, near the Extremity of this Inſtrument, are very ſufficient, and will generally diſcharge the Urine in a very conſiderable Stream. More Apertures would probably render the Uſe of this Inſtrument not ſo ſafe and practicable; eſpecially when the *Corpus ſpongioſum Urethræ* is diſtended with Blood, whereby ſome Part of it may be preſſed into the Apertures, ſo as to wound the Parts, and obſtruct the Progreſs of the Inſtrument. For this Reaſon, the celebrated PETIT has recommended Catheters of another Make, without any Apertures in the Sides, as in *Tab.* XXVII. *Fig.* 7. which, though cried up, and greatly applauded, for a new Invention, by GARENGEOT [c], was long before delineated by DE LA CHAMP [d]; though he directs it for removing Caruncles of the

[a] *Lib. de Lithiaſi, Cap.* 3. *No.* 34.
[b] As NUCK in *Experim. Chirurg.* p. 124. and SOLINGEN, in *Chirurg.* Tab. VIII.
[c] *Lib. de Inſt. Chirurg.* Tom. I. p. 267.
[d] In *Chirurg.* p. 322.

Urethra. In this Inſtrument the Aperture is at the Extremity A, *Fig.* 7. which is ſhut by a pyriform Button, marked B. When this kind of Catheter is paſſed into the Bladder, the Handle of the Wire C, is preſſed inward, by which Means the Button marked B, is thruſt out of the Tube, as is repreſented at D, in the next Figure: and thus a Paſſage is given to the Urine. To conclude, the Catheter may be alſo of Uſe to inject various Liquors into the Bladder, in ſeveral Diſorders, when the Tube of this Inſtrument is faſtened to a Syringe or common Bladder, from whence the Injection is to be forced; which has been remarked by ÆGINETA, *Lib.* VI. *Cap.* 59. An Abſceſs in the Neck of the Bladder, cauſing a Retention of the Urine, has been ſometimes broke by paſſing the Catheter, and the Suppreſſion thereby removed. A particular Diſſertation on this Operation, intituled *De Catheteriſmo*, has been publiſhed here, at *Helmſtadt*, by MEIBOMIUS, *Ann.* 1699.

CHAP. CXXXVIII.

Of CARUNCLES *in the* URETHRA.

I. MEN, who have formerly had a Gonorrhœa, or an Ulceration of the Urethra, frequently meet with extreme Difficulty in voiding their Urine, ſo that it cannot be diſcharged without great Pain, and Straining, and runs in a ſmall Stream like a Thread, being ſometimes alſo totally obſtructed or ſuppreſſed. This Diſorder has been attributed by the Phyſicians of preceding Ages to a Caruncle, or fleſhy Excreſcence, in the Cavity of the Urethra: till of late SAVIARD, and BRUNNER, a celebrated Phyſician to the Elector *Palatine*, and DIONIS, in his Surgery, rejecting the ancient Opinion, have deduced it, perhaps with more Reaſon, from a Cicatrix, rather than a Caruncle, remaining after the Cure of an Ulcer in this Part, which has been occaſioned by a Gonorrhœa. Their Opinion is confirmed to be true, in many Inſtances, of Bodies that have been opened after Death, labouring under this Complaint. Though in many Caſes alledged by ARNEAU and PETIT, the Cauſe of this Diſorder has been neither a Caruncle nor Cicatrix, but a Tumor formed in the ſpongy or cavernous Body of the Urethra itſelf (in the ſame Manner as the Membranes of the Noſe are tumified in a Coryza) ſo as to occlude the Paſſage of that Canal. However, the Experience of one Party may be oppoſed by the other in this Diſorder: they may perhaps both be in the right, as the very ſame Diſeaſe may proceed from different Cauſes. Though we find BENEVOLUS, a celebrated *Italian* Phyſician of *Florence*, yet diſſenting from both theſe Opinions. He declares, in an expreſs Treatiſe on the Subject, that he has always found the Cauſe of this Diſorder to be a Tumor or Ulceration, and Enlargement of the natural Tubercle, in the Proſtate, called by Anatomiſts *Caput Gallinaginis*: but that he could never yet find the Urine obſtructed, in this Complaint, from a Caruncle in the Cavity of the Urethra. He always obſerved the Obſtruction to be more or leſs, in Proportion to the Quantity of Matter lodged in the *Caput Gallinaginis*. He ſays, the Diſorder almoſt conſtantly follows a virulent Gonorrhœa, and that both its beginning and latter End are accompanied with diſcharges of purulent Matter and Fibres with the Urine. For my own Part, I

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muſt acknowledge there may be Truth on the Side of each of theſe Gentlemen, though I am not for confining the Diſorder to one particular Cauſe. But which ever Cauſe, or Opinion, takes Place in this Complaint, it is no great Matter; ſince the Method of Cure is one and the ſame in all.

II. The Surgeon may reaſonably determine, whether it proceeds from a Caruncle, by the Patient's Relation, and Symptoms of the Diſorder. For, in that Caſe, the Obſtruction is not ſo ſudden; but the Urine flows in a ſmall Stream, and gradually leſſens, till it is totally ſuppreſſed: the Patient is alſo continually endeavouring to void his Urine, from the Irritation of the foreign Body in the Urethra. Sometimes a ſlight Fever attends the Complaint. But the Seat of the Obſtacle in the Urethra may be nearly determined by paſſing a Catheter, leaden Probe, or Wax-candle, into that Canal. For wherever the Inſtrument meets with more than ordinary Reſiſtance, there may be reaſonably conjectured to be the Seat of the Complaint. Laſtly, as this Diſorder is often attended with moſt violent Pain and Anguiſh from the extreme Difficulty of voiding the Urine, ſo as often to hazard, and ſometimes totally deſtroy the Life of the Patient; the Surgeon ſhould be therefore well acquainted with the Methods of relieving one thus afflicted. Diagnoſis.

III. If the Diſorder be of no long ſtanding, and there appears to be no great Stricture in the Urethra, the Surgeon may then ſucceed, without much Difficulty, by the following Practice. The Patient being ſeated on a Couch or his Bed, the Surgeon holds the Penis with his left Hand, while with his right he introduces a Probe of Lead or Wax-candle (of about a Foot long, and Thickneſs of an ordinary, or rather a large Catheter, which has been firſt dipt in Oil) into the Urethra, until he has arrived at the Obſtacle, and paſſed a little beyond it. This being ſecured by proper Bandage from falling out, is to remain there for ſome Days; till by compreſſing the Obſtacle the Urethra appears to be pervious, as uſual, or the recent Diſorder at leaſt much checked in its Progreſs. The leaden Probe, or Wax-candle, is to be extracted every Time the Patient wants to diſcharge his Urine, and then to be introduced and ſecured again in the preceding Manner, in which it is to be continued, until the Complaint is entirely removed. Method of removing ſlight Caruncles.

IV. But if the Diſorder be ſo obſtinate, or inveterate, as not to yield to the preceding Method; it will then be neceſſary, according to the general Practice, to dreſs the End of the leaden Probe or Wax-candle with *Vitriolum R. Alum. uſt.* or *Præcipit. rub. cum Ung. fuſc. vel Ægyptiac.* to be paſſed into the Urethra to touch the Obſtacle. This, according to the general Advice, ſhould be repeated two or three Times in a Day, till the ſuperfluous and morbid Excreſcence is corroded and removed by the Applications, and a free Paſſage thereby made for the Urine. Concerning the Succeſs of which Practice we are furniſhed with various Inſtances. But SAVIARD, BRUNNER, BENEVOLUS, and COLET, who will not allow the Diſorder to ariſe from any Caruncles, or fleſhy Excreſcences in the Urethra, condemn this Practice, as pernicious, and apt to corrode or ulcerate the Urethra. Nor do I myſelf approve of it, when there is no Caruncle or Obſtable in the Urethra, but only in ſuch of thoſe Caſes, as will not yield to the milder Practice firſt mentioned. But it may be here neceſſary to obſerve, that the Patient ſhould always diſcharge his Urine, before the leaden Probe or Wax-candle be paſſed into the Urethra, that it may remain there the Inveterate Caruncles.

longer without Extraction, and ſo more effectually dilate the Parts. And even when a free Paſſage has been this Way obtained for the Urine, it may be neceſſary to retain a Tent or Inſtrument of the like Kind a few Weeks, or at Intervals, in the Urethra, that the Parts lately made pervious, may remain ſo more effectually and ſecurely. Laſtly, BENEVOLUS adviſes to furniſh the End of the Probe with a Piece of *Emplaſt. Diapalmæ*, that it may more diſtend and heal the morbid or ulcerated Part of the Urethra than the reſt. But I think that Intention may be anſwered much better, as I have indeed often experienced, by injecting *Aq. Calc. vel Plantag. cum pauco Sacch. Saturni, vel Lapid. medicamentoſ. Crollii*, which are found extremely ſerviceable in cleanſing and ſiccatrizing Ulcerations in general.

Treatment of the more obſtinate Caruncles.

V. When the Paſſage of the Urethra is entirely blocked up in this Diſorder, ſo that no Urine can be evacuated; it will then be neceſſary, if there is no great Inflammation, to ſeek for Relief from the Catheter. If the Inſtrument meets the Stricture or Obſtacle in the Urethra, it ſhould be ſtrongly, but cautiouſly, preſſed, by twiſting it through the ſame, to break or divide the Caruncle or Cicatrix, and dilate the Parts for a more free Paſſage. And after drawing off the Urine, a leaden Probe or Wax-candle dipt in Oil, may be introduced and retained in the Urethra, as before, to keep it pervious. But if either the Catheter cannot be paſſed, becauſe of the violent Inflammation and Pain, or the Urethra can be by no Means opened, ſo that the Patient's Life is in the utmoſt Danger; the laſt and moſt ſevere Remedy left, is, to make an Apertion or Paracenteſis of the Bladder with the Trocar, either *in Perinæo* or above the *Os Pubis*, in that Part of the Abdomen, where the high Operation is performed for the Stone, which we ſhall quickly explain at large. The Patient's Life being ſecured by the Bladder thus opened, and Urine diſcharged by the Cannula, left in the Bladder; the Surgeon next proceeds to treat the Diſorder in the Urethra by the Methods before propoſed, until he has rendered the Urethra pervious, and obtained a free and natural Paſſage for the Urine: after which, the Cannula of the Trocar may be extracted, and the Wound healed.

Inflammation of the Urethra, how to be treated.

VI. If the Retention of Urine ſhould proceed from an Inflammation of the Urethra, or Neck of the Bladder, and that in a violent Degree; the Surgeon ſhould not then introduce either the Catheter, Probe, or Wax-candle, becauſe either of them will greatly increaſe the Inflammation, and conſequently the Diſorder. He ſhould rather bleed the Patient largely, and ply him with diſcutient Medicines, both internally and externally. Particularly the Parts affected ſhould be treated with diſcutient Fomentations and Cataplaſms, in order to abate the Inflammation and Tumor: and then the Urethra may be compreſſed, and a Paſſage made by retaining a Wax-candle, leaden Probe, or the Catheter, for ſeveral Days in the Urethra. But when the Inflammation of the Urethra is ſlight, the Urine may be immediately drawn off by the Catheter, without any farther Apparatus.

Some neceſſary Obſervations.

VII. It is a neceſſary Caution, with regard to the Wax-candle, which is to dilate and open the Urethra, that it be not protruded too far, or thruſt into the Bladder itſelf. For in that Caſe, ſome part of the Wax may be ſeparated, and ſtay behind in the Bladder, where it will form the Baſis of a future Calculus or Stone. When the Difficulty of diſcharging the Urine proceeds from ſome Diſorder

Diſorder in the Bladder itſelf, as an Excreſcence, Abſceſs, Ulcer, an Induration or Calloſity of its Neck, or in the Proſtate, it is but ſeldom that the Patient can find any Relief from the Hand either of the Pyſician or Surgeon. For the leaden Probe, Wax candle, or uſe of corroding Medicines, are here not only uſeleſs, but pernicious. On the contrary, when the Urine is obſtructed by ſome Tumor, Ulcer, or Cicatrix in the Urethra only, the beſt Method of relieving the Patient will be by the leaden Probe or Wax candle dipt in Oil. Though a Cicatrix in the Urethra is more difficult to be removed this way, than a Tumor or Ulcer; we are at preſent unacquainted with better Means of dilating and opening the Urethra: and that this Method will often ſucceed very well, even in a Cicatrix, is confirmed by Experience, as well as the Authority of BENEVOLUS.

CHAP. CXXXIX.

The Method of extracting a CALCULUS *in the* URETHRA.

I. IN Patients ſubject to the Gravel, or ſabulous Concretions, we often meet with a Calculus or ſmall Stone, obſtructing the Urethra, ſo as to deny any Paſſage to the Urine, and often exciting the moſt excruciating Pains, as well as occaſioning a total Suppreſſion of the Urine. This is a deplorable Caſe for the Patient; to relieve which, the Phyſician or Surgeon ſhould endeavour to extract the Calculus without delay. The Seat of the Calculus in the Urethra is various, being ſometimes at its beginning, in the Sphincter or Neck of the Bladder, behind the *Scrotum*, *in Perinæo*; and ſometimes in the Middle of the Urethra, or elſe near its Extremity in the *Glans Penis*. Sometimes, again the Calculus is included in a particular kind of Sacculus or Expanſion of the Urethra; which has been obſerved by LE DRAN (*Tom.* II. *Obſ.* 79.) and DENYS (*Obſ. Chir. p.* 144.) mentions a like Caſe. In the Year 1737 I alſo found two *Calculi* contained in this kind of Sacculus at the Bottom of the Urethra before the Scrotum, from whence I cut them out. Which is indeed an extraordinary Caſe, and the two *Calculi* I have repreſented in *Tab.* XXVII. *Fig.* 16, 17. But the particular Part of the Urethra, in which the Calculus is lodged, may be known without much Difficulty, from the Seat of the Pain, by feeling and by probing with an Inſtrument. The Method without cutting.

II. As the Seat of this Diſorder is various, ſo alſo is the Method of treating it. It may, in the firſt Place, be proper to try the Efficacy of Diuretics internally, with the Uſe of Fomentations, Cataplaſms, Gliſters, and bathing externally, continued for ſome time. But if they prove inſufficient, a Quantity of Oil of Olives or ſweet Almonds may be injected into the Urethra, to lubricate its Surface, together with that of the Calculus, and facilitate its Diſcharge: to promote which, the Patient may alſo ſit in a Semicupium or Bath, made with emollient Herbs. Some make a Ligature upon the Penis, behind the Calculus, and by ſtrongly inflating the fore Part of the Urethra, they dilate it, ſo as to make way for the Calculus to come forwards, and be diſcharged.

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This Practice is by PROSP. ALPINUS [a] said to be very common and familiar with the *Ægyptians*.

The cure by cutting.

III. If the Calculus resists all those Means, and the Suppression of Urine, with the other Symptoms, increase; it will then be necessary to try a more severe, but effectual Means for its removal by the Knife. If the Calculus is perceived to lodge in the Neck of the Bladder, it may be extracted by a *Section in Perinæo*, where the Stone is perceived by the Touch. But if the Patient will not submit to the Operation, the Calculus may for the present be pushed back by the Catheter into the Bladder: though the Operation, in my Opinion, is much preferable, because the Stone will otherwise grow much larger in the Bladder, and subject the Patient to greater and perpetual Disorders. If the Stone should stick so fast, that the Catheter cannot easily repel it; or if the Surgeon, for the forementioned Reason, is unwilling so to do; it may be extracted by Incision, or the Operation for Lithotomy termed *Apparatus minor*, described in the following Chapter: *viz.* by inserting one Finger into the Anus, to hold the Calculus firm in its place, and making an Incision upon it, large enough for its Extraction. If the Calculus is lodged near the Glans, the best Method will be to inject Oil into the Urethra, after the external Applications before-mentioned have been applied some Time to the Part: And thus by relaxing, lubricating, and gently pressing with the Fingers, to which we may add Suction, in Infants, the Calculus may be often happily discharged, without running the Hazard of a Wound, Cicatrix, and Fistula in the Urethra, from the Operation [b]. If the Calculus stops near the external Orifice of the Urethra, it may be then extracted by a Hook, a Pair of Pliers, or an Ear-pick. See *Tab.* VI. *Fig.* 14. But if those Instruments prove insufficient, it may be proper to try that described and recommended by MARIANUS for the same Purpose, as in *Tab.* XXIX. *Fig.* 7. the Part or Eye marked A, dipt in Oil, is to be cautiously protruded into the Urethra beyond the Calculus, so as to intercept or catch it; after which, it is to be drawn out together with the Calculus, by the Handle B. If through the Violence of the Inflammation, or Largeness of the Stone, all these Means prove ineffectual; there is then no other Method of relieving the Patient, but by the Operation, as TULPIUS and GARENGEOT also affirm. The Extremity of the Urethra in the Glans is therefore to be divided with a Pair of Scissars, and the Calculus pushed out, by introducing a Probe or small Hook; and then the Parts wounded are to be washed with Wine, and dressed with some vulnerary Balsam. A remarkable Instance of a Stone extracted from the Urethra is to be seen in SCULTETUS, *Obs.* 66.

When the Calculus is in the Middle of the Urethra.

IV. When all the Means now cited prove without Success, as they frequently do, when the Calculus lies in the Middle of the Urethra; there is then no other way left to save the Patient, and relieve him from his Disorder, than by opening the Urethra, and making an Incision through it with the Scalpel upon the Body of the Calculus, enlarging it sufficiently upward and downward for the Extraction of the Calculus. More particularly, thus: The Skin of the Penis

[a] *In Medicina Ægyptiorum*, Lib. III. Cap. XIV.

[b] Instances of Stones extracted by these Means, may be seen in V. HORN's *Microtec.* and TULPIUS, *Obs.* 8. *Lib.* III. An Example of a Calculus extracted by Pliers, see in SCULTETUS, *Obs.* 63.

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is to be drawn tenſe, either forwards, as CELSUS [a] adviſes, or backwards, according to WIDENMANNUS [b]; and the Glans being either covered with, or denudated of its Præpuce, a Ligature is made upon the Penis behind the Calculus; leſt by the Preſſure of the Surgeon's Hands it ſhould be forced farther into the Urethra. The Surgeon then preſſes his left Thumb upon the Calculus, that it may neither ſlip backward nor forward; while with his right Hand he makes a longitudinal Inciſion on one Side of the Urethra, large enough to extract the Calculus, either with his Fingers, or Inſtruments, *viz.* a Pair of Pliers, Probe, or Hook. After the Stone is extracted, the Skin of the Penis is let looſe, and the Wound dreſſed with ſome vulnerary Balſam, a Plaſter, *&c.* If the Inciſion be very long, it is adviſeable to inſert a leaden Cannula or Tube into the Urethra beyond the Wound, to receive and diſcharge the Urine, that it may not paſs through the Wound, whoſe Agglutination and Cure would be very much retarded by the Acrimony of the excrementious Liquor, and poſſibly degenerate into a callous Ulcer. The Wound may be alſo preſerved from the Urine, by directing the Patient to drink but very little, a few Days before and after the Operation. The Inciſion is directed to be made laterally, becauſe the Wound in that Poſition is not ſo apt to receive Injury from the Urine in its Paſſage, as it would, if it had been made in the Bottom of the Urethra. It would have been dangerous to have directed the Inciſion in the upper Part of the Penis, becauſe then the *Corpora Cavernoſa* muſt have been wounded, the Conſequence of which might be a fatal Hæmorrhage, or other malignant Symptoms. ALBUCASIS, one of the beſt *Arabian* Phyſicians, adviſes to break the Stone, when it ſticks in the Urethra, by boring it with an Inſtrument, which he delineates, when it cannot be preſſed out by the Fingers. PAREY, and others, propoſe the ſame Inſtrument. But ſuch an Inſtrument can hardly be uſed without greatly injuring the Urethra in boring the Calculus. If ſuch an Inſtrument ſhould not ſucceed, ALBUCASIS then adviſes to make a Ligature upon the Penis on each Side the Calculus, that it may not move either backward or forward: after which it is to be extracted by Inciſion [c].

V. We have already explained the uſual Method of dividing the Urethra by Inciſion, for extracting the Calculus. It now remains for us to deſcribe a new Method, invented by a celebrated Surgeon of *Paris*, named THIBAUT, to prevent a Fiſtula in the Urethra, and deſcribed by GARENGEOT. It is briefly this. He holds the Penis in his left Hand, and makes an Inciſion firſt laterally through the Skin, and then above through the Urethra, which is firſt freed from the *Corpora Cavernoſa Penis* by a Scalpel. The Urethra is divided by a longitudinal Inciſion upon the Calculus, under the *Corpoſa Cavernoſa.* And after extracting the Stone by a Hook or Pliers, the Wound is dreſſed up with ſome Balſam, ſcraped Lint, Compreſs and Bandage. Thus they aſſert, the Wound in the Urethra will heal much ſooner, as being covered with the *Corpora Cavernoſa Penis.* THIBAUT'S Method.

VI. When theſe Calculi are included in a particular kind of Sacculus, I think the beſt Method is to make a lateral Inciſion in the Part moſt convenient for When the Stone is included in a Sacculus.

[a] *Lib.* VII. *Cap.* 26. [b] In *Lib. German. de Lithotomia*, Pag. 58 and 59.
[c] *Vide Opera ejus*, Part. II. Cap. 61.

their Extraction. And thus I took out the two Calculi before-mentioned, N° 1. figured in *Tab.* XXVII. *Fig.* 16. and 17. by making an Inciſion ſufficiently large. I then treated the Cavity of the Sacculus firſt with digeſtive Ointments, and then with corroding Medicines, (ſuch as *Merc. præcipit. rub.* and ſometimes, even *Lapis Infernalis)* compleating the Cure with *Balſ. Capiv. & Emplaſt. agglutinant.* But a Wound in this Part is not eaſily to be healed, as may be learned from the 79th *Obſ.* of Le Dran, where almoſt every Artifice was uſed in vain. *Vid.* Tulpii *Obſ. L.* III. *Cap.* 8. & Roonhuys, *Obſ.* 27.

CHAP. CXL.

Of Lithotomy, *or cutting for the Stone in Males, particularly by the old Method, termed* Apparatus Minor; *where we ſhall alſo propoſe ſomething concerning* Nephrotomy.

I. *Lithotomy*, or cutting for the Stone, ſometimes called *Cyſtotomy*, from the *Greek*, Κύστις, *Veſica*, is an artificial Opening or Inciſion made into the Bladder, for the Extraction of ſome offenſive concreted or indurated Body. But when the Stone is cut out of the Kidney, which very rarely happens, the Operation is then termed *Nephrotomy*; which we ſhall alſo preſently conſider in this Chapter [a]. This Operation is rendered neceſſary, becauſe there is no other Method, that we are yet acquainted with, of extracting a Calculus, when it is too large for the Urethra; cauſing extreme Pain, Inflammation, Ulceration, and a Strangury, or a total Suppreſſion of the Urine, followed with Convulſions, and ſometimes a miſerable Death. I am ſenſible, that many Phyſicians, and others will have it poſſible to diſſolve, break, or otherwiſe diminiſh and expel the Stone in the Bladder by internal Medicines: and I myſelf have given a remarkable Inſtance, in favour of this Opinion, in the *Philoſ. Tranſact.* N° 417. *p.* 13. the greateſt Part of the Fragments of which Stones I have now by me. But we have never yet been ſo happy, as to find a Medicine that will certainly diſſolve the Stone in all Patients, in any reaſonable Time; and the Succeſs attributed to ſome famous Noſtrums has been frequently owing more to Chance, or other particular Incidents, than the Medicine itſelf. Nor am I ſenſible of any other certain Method of relieving the Patient from a large Stone, than by the Operation. And if ſuch a Diſſolvent was known, there is no doubt but the Rich and Great, who are well diſpoſed, would be at any Expence for ſo general a Good: an Inſtance of which we have had lately, though without its good Effect. Nor do I know, that the *Ægyptian* Method of inflating the Urethra to diſcharge the Stone in the Bladder, was ever tried with

[a] Though the Bladder and Kidneys are more ſubject to calculous Concretions than other Parts, yet we are aſſured by Experience, and the many Inſtances cited by the medical Writers of Obſervations, that Stones have been found in all the other Parts of the Body: of which we have a large Number of Examples collected and publiſhed by Crellius, in a Pamphlet, intituled, *Marmorea memoria Seligmanni. Lipſiæ*, 1708. But I think they ſhould be always extirpated, when practicable, as they excite Pain, and other bad Symptoms.

Succeſs in *Europe*, as ſome [a] would fain perſuade us it may. But for the Operation of Lithotomy itſelf, it is ſo difficult and dangerous, that it has been with Reaſon ordained among the Ancients to be the entire Profeſſion of one Phyſician, free from other Studies and Practice, that he might be the more expert in this Art [b]. For if the Structure of the Bladder, and its true Diſpoſition with regard to the adjacent Parts, be not firſt well known, and the Surgeon expert in the Enchireſis, or the neceſſary Arts to be uſed in cutting, and in extracting the Stone; it is very poſſible, that the Patient may through ſuch Defect loſe his Life in the Operation.

Origin of the Stone.

II. We are aſſured from Experience, that Children are more ſubject to the Stone than Adults: and that the Children of Poor People have it oftner than thoſe of the Rich. Becauſe thoſe of the poor eat more plentifully, and of a groſſer Food, which is not ſo eaſily digeſted: hence the Blood is filled with a groſſer Chyle, whoſe Parts will be more apt to run into Coheſions in all the ſecretory Veſſels, and particularly thoſe of the Kidneys, whence the Stone in the Bladder. In Children the Original of the Stone is generally in the Bladder, without any preceding Pains in the Kidneys. But in Adults the firſt Rudiments of a Calculus are generally ſome previous Obſtruction, ſabulous Concretion, or an Inflammation in the Kidneys. But as to the long Train of Cauſes, to which many of the Moderns attribute the Origin of the Stone in the Bladder, ſuch as living too much upon Cheeſe, plentiful drinking of Rheniſh Wine, *&c.* they are either too remote to be well known, or too uncertain for the Phyſician to have any Dependence thereon. The Stone then, is uſually firſt formed of a very few Particles in the Kidney, which ſliding through the Ureter into the Bladder, attract ſimilar Particles from the Urine retained there, until it at laſt advances to the Weight of many Ounces, and ſometimes to ſeveral Pounds [c], changing the Name of Gravel for that of the Stone in the Bladder. For while the Concrete remains in the Kidney, it is termed the Gravel or Stone in the Kidney; which, when it is of a very conſiderable Size, can be removed by no Means whatever, unleſs it ſhould occaſion an Abſceſs in the Loins: which being opened, either naturally, or by the Scalpel, the Stone may be then extricated. This laſt way is termed Nephrotomy. But there are ſeveral Methods for extracting the Stone in the Bladder by Lithotomy, when it is not of an extraorditary Size. Sometimes there is but one Stone in the Bladder, and ſometimes more, to above twenty, thirty, or forty [d]. Some Stones of the Bladder are ſmooth and poliſhed; others are rough and ſhard pointed: Some are ſoft and friable, like Mortar; others are very hard and ſolid, like Pebbles or Flint.

Signs of the Stone in the Bladder.

III. Before the Surgeon proceeds to the Operation, he ſhould be well ſatisfied of the real Exiſtence of a Stone in the Bladder: becauſe the very ſame

[a] Prosper Alpinus, in particular, in his *Medicina Ægypt.* p. 104.

[b] See the Oath of Hippocrates; and Celsus, *Lib.* VII. *Cap.* 26. Ægineta, *Lib.* III. *Cap.* 45. *Lib.* VI. *Cap.* 60.

[c] Inſtances of which may be ſeen in Greenfield's Treatiſe of the Stone and Gravel, Denys, Crellius, and others.

[d] As in Greenfield and Ruysch, *Obſ.* 1. *p.* 2. in both which Caſes there were extracted forty two Stones.

Symptoms are often occaſioned from ſome other cauſe, as a Tumor, Inflammation, Abſceſs, or Ulcer in the Bladder, or its Neck. And it would be both cruel and imprudent to ſubject the Patient to ſo ſevere and dangerous an Operation, without abſolute Neceſſity. To perform the Operation on a Patient, who has no Stone, would be to ſhew his own Ignorance, or an Intention to deceive the Patient. To be aſſured therefore of the Stone in the Bladder, the Surgeon ſhould attend to the following Signs, *viz.* the Patient uſually feels a Pain, Heat, and Itching in that Part of the Bladder where the Stone is lodged. Sometimes it is with great Pain and Difficulty that he diſcharges his Urine: Sometimes it drops involuntarily. It is generally pale, turbid, and of a bad Smell, partly with a mucous Sediment at the Bottom of the Veſſel, and ſometimes accompanied with a purulent Matter, or with Blood, when the Stone is rough and ſharp pointed. To theſe we may add, that an uneaſy Senſation and Itching is felt by the Patient in all the Parts betwixt the *Perinæum* and Extremity of the *Glans Penis*. Upon which account, Boys afflicted with the Stone, are continually pulling their Præpuce, as it gives a little Eaſe to their Pain, ſo that their Penis becomes by that Means extended much longer than uſual. But all the Signs now mentioned are both uncertain and inconſtant, as all of them may ariſe equally from an Inflammation, Abſceſs, Ulcer, or Scirrhoſity in the Neck of the Bladder or the proſtate Gland, as alſo from too great Acrimony in the Urine, and other Cauſes. There is a ready Method of diſcovering the Stone, more certain than any of the preceding, uſed formerly by the ancient Phyſicians, and at preſent by itinerant Lithotomiſts. This is by introducing one or two Fingers into the Anus of the Patient, ſtanding or laying down: preſſing the other Hand againſt the Abdomen, immediately above the *Os Pubis*, by which Means the Bladder may be explored by the Fingers *in Ano*, from the Weight and Hardneſs of which, they certainly conclude that there is a Stone in the Bladder. But even this Method, though it be not contemptible, is by no Means to be relied upon as infallible: becauſe we find by Experience, that the Surgeon may be this way deceived, by miſtaking a ſcirrhous, callous, or other Tumor in the Bladder, Rectum, or Proſtate, for a Stone, which appears to the Finger, in this Method of ſearching, much in the ſame Manner. There is therefore no other certain and infallible Method of being aſſured that there is a Stone in the Bladder, than that of ſearching with the Catheter: the Method of paſſing which Inſtrument through the Urethra into the Bladder, for this Purpoſe, we have before deſcribed in *Chap.* CXXXVII. For the Hardneſs or Reſiſtance, and Colliſion or Sound, afforded by the meeting of the two Bodies, are a certain Proof, not only of the Exiſtence of a Stone, but alſo a pretty ſure Mark of its Size, Solidity, and Diſpoſition of its Surface. If the Catheter immediately hits upon it, and conſtantly touches it, it is a Sign of a large Stone: whereas if it be ſome Time before you can touch the Calculus with the Catheter, and do not eaſily meet with it again, it is a Sign of Smallneſs. However, we are obliged to confeſs, that even the Signs afforded by the Catheter, are ſometimes liable to deceive us in forming a Judgment concerning the Stone in the Bladder. For (1) the Hardneſs or Reſiſtance ſometimes perceived by this Inſtrument, is not from a Stone, but ſome Excreſcence, Tumor, or Induration, in part of the Bladder itſelf. And then (2) a ſmall Stone may be concealed from the Catheter in ſome

ſome Receſs or Cell in the Bladder (ſee *Tab.* XXXI. *Fig.* 1, 2.) ſo that it cannot be well touched. And laſtly (3) there are Caſes, which frequently occur, where the Catheter cannot be preſſed into the Bladder, being prevented by the Inflammation, or ſome other Accident. So that the Surgeon is obliged to ſearch by introducing his Finger *in Ano*, by which Means the Size of the foreign Body may be alſo pretty well diſcovered.

IV. When we are aſſured by the Signs now mentioned, that there is a Stone in the Bladder, ſo large, that it will not paſs through the Urethra, but fatigues the Patient with the moſt grievous Symptoms[a]; there is then but one certain, though a ſevere Method of removing the Diſorder: *viz.* by the Operation of Lithotomy, all internal Means being either uſeleſs or uncertain. If the Severity of the Diſeaſe therefore brings the Patient to a Reſolution to undergo the Operation, it ſhould be a Matter of the laſt Importance with a prudent Surgeon, to be previouſly ſatisfied, with regard to the Probability of his Succeſs or Miſcarriage in the Operation, from the various Circumſtances of the Caſe; leſt he ſhould meet with unexpected Death inſtead of a promiſed Recovery. For notwithſtanding we at preſent poſſeſs many Advantages over our Anceſtors in this Operation, by new Improvements in Inſtruments, and the Methods of uſing them; the Operation of Lithotomy is ſtill very dangerous, though the Patient does not run ſo great a Hazard of his Life, when of a good Habit, as formerly. We may obſerve, that it is a great Diſadvantage to the Patient to have a Stone that is very large, and rough ſurfaced, or ſharp pointed. Such is the Size, ſometimes, of the Stone in the Bladder, that we are aſſured by many Inſtances, that it could by no Means be extracted in the Operation[b]. A Stone of a moderate, or even a large Size, with a ſmooth Surface, may be extracted with a great deal more Eaſe, than one that is very ſmall, as it is a Difficulty to lay hold of the laſt. The Stone in the Bladder is uſually larger or ſmaller, in Proportion as it has continued there a longer or ſhorter Time; increaſing gradually, by ſmall and rough Grains of ſaline and earthy Matter, or by ſmooth Lamellæ, or Coats, over each other, like an Onion. Such therefore do not conſult the Advantage of themſelves, or others, who endeavour to delay and put off the Operation; eſpecially when the Stone appears already to be ſufficiently large: for by ſuch Delays the Stone enlarges, ſo as to render the Operation much more dangerous and difficult. When a Patient has been worn out by the Stone, or ſome other Diſorder, then alſo the Operation is not very likely to ſucceed. The Patient may perhaps die in the Operation. Laſtly, the more Strength and better Habit the Patient has, and the ſmoother-ſurfaced, and more moderate ſized are the Stones, though ſeveral in Number; the greater Proſpect there is of a ready and happy Cure by the Operation. With reſpect to the Age of the Patient, though Celsus is of Opinion that none ſhould be undertaken before the ninth or after the fourteenth; many famous Phyſicians maintain the contrary: and they have Ex- Prognoſis.

[a] If the Patient be not troubled with any violent Symptoms from the Stone, he may, by palliating Medicines, often retain it as long as he lives, without much Injury; as may be ſeen in Rossetus, Wedelii *Diſſ. de Lithot. & Ephem. Nat. Cur. Cent.* IX. *Obſ.* 2.

[b] Thus the celebrated Archiater and Profeſſor Borichius died in the Operation, becauſe the Stone could not be extracted, it was ſo large. See his Life in *Conſpect. Sciptor. Chemic.*

perience

perience on their ſide. I myſelf have cut very young Children, and particularly one of two Years and a half, with ſucceſs. I likewiſe ſucceeded in a young Man of Nineteen, whom I cut in the Year 1745. Nay it has been practiſed happily even upon antient Patients, of a good Habit and Conſtitution; as ÆGINETA, SCHACCHUS and others aſſure us.

Prerequiſites to the Operation.

V. When the Operation is therefore reſolved upon, after duly weighing all the forementioned Circumſtances; there are then three Things neceſſary to be conſidered by the prudent Surgeon. (1) What is to be done before the Operation is undertaken or begun, (2) what is neceſſary to be done in the Operation itſelf; and laſtly, (3) what after the Operation is concluded. Before the Operation is begun, he ſhould judiciouſly determine (1) which of the Methods is to be uſed, as there are ſeveral; and (2) fix a convenient Time for the Operation; before which he ſhould (3) prepare the Patient by a proper Regimen, or Medicines: (4) he muſt provide the neceſſary Apparatus of Inſtruments; and laſtly (5) he is to diſpoſe and ſecure the Patient in a proper Poſture for his Work.

The ſeveral Methods of Lithotomy diſtinguiſhed

VI. Firſt, with regard to the Method of operating to be choſen by the Surgeon, it is to be obſerved, that there are chiefly four Ways of performing Lithotomy, for the Stone in the Bladder. The firſt and moſt ancient is, from the few Inſtruments employed, diſtinguiſhed by the Title of *Apparatus Minor*. And as this Method has been received and approved of by CELSUS, and GUIDO CAULIACO; it is by ſome denominated *Methodus Celſiana, vel Guidoniana*. The ſecond Method of Lithotomy is, from the Number of Inſtruments uſed therein, termed *Apparatus Magnus*, or MARIANUS's Method. If we reſpect the Date of them, the firſt is by ſome termed the *Old*, and the ſecond the *new Method*; as having been contrived within theſe two Centuries: Whereas the old Method had been extant for above two thouſand Years. The third Method of performing Lithotomy is termed *Apparatus altus*, or, ſometimes, *Sectio Hypogaſtrica*. In this the Inciſion is made in the lower Part of the Abdomen, in the Anterior Side of the Bladder, immediately above the *Os Pubis*: whereas in all the other Methods, the Inciſion is made *in Perinæo*, betwixt the *Anus* and *Scrotum*. This third Method is alſo, by ſome, denominated *Franconica*, from PETER FRANCUS, who practiſing it on an emergent Occaſion, is ſaid to be the firſt Author of it, though he afterwards diſſuaded from the Uſe of it. The fourth and laſt Method of cutting for the Stone, which is alſo the moſt Modern, having been invented towards the End of the laſt Century, is termed the *lateral Operation*, or *Methodus fratris Jacobi*, as being invented by a *French* Monk named FRERE JAQUES, who firſt practiſed it with ſurprizing Succeſs, and great Applauſe. It is alſo (but ſeldom) termed RAW's *Method*. We ſhall treat of each of theſe Methods in their diſtinct Chapters following, but I have not had Opportunity of experiencing all of them in my own Practice.

The Time convenient for performing Lithotomy.

VII. We before obſerved that a convenient Time ſhould be fixed for performing the Operation of Lithotomy; which may vary according to Choice or Neceſſity. It is to be obſerved, that the Operation may be performed at any ſeaſon of the Year with us in *Germany*: for in the Summer Time the Air is more temperate or leſs hot than in other Countries, and in Winter, the Cold-

neſs

neſs of the Air may be removed and moderated at Pleaſure by our Stoves. Though it muſt be confeſſed that Spring and Autumn ſeem to be more favourable for the Operation than other Seaſons: So that when there is no urgent Neceſſity, the Caſe may be deferred until then. But it would be baſe in a Surgeon to neglect the Patient on this account, when there is a real Neceſſity for his performing the Operation before; the Patient being all the while tormented, and perhaps loſt, for want of Help, of which we have had many Inſtances.

VIII. With regard to the Method of preparing the Patient for the Operation, he ſhould be directed to live on a ſpare Diet for ſeveral Days [a]; and if he be an Adult, of a full Habit, he ſhould be bled, which may be omitted in Boys: though in both, the Body is to be kept open with laxative Medicines. The Evening before the Operation, or the Morning of the ſame Day, a purging Clyſter ſhould be adminiſtered to the Patient; that he may not foul and obſcure the Surgeon's work with his Fæces, which are generally diſcharged in cutting. On the contrary, if the Patient be weak, and low, he ſhould be ſupported by a nouriſhing Diet, and proper Medicines. Three or four Hours before the Operation, it may not be amiſs to give him, according to the *French* Cuſtom, ſome ſtrong Broth, or a couple of Eggs poached ſoft, to be drank in ſome Wine; or if he be a Child, one Egg may ſuffice. And laſtly, it may be proper to ſhave off the Hair, if there is any, *in Perinæo*. Method of preparing the Patient.

IX. The Apparatus of Inſtruments, Bandage, and Dreſſing, for the Operation of Lithotomy, varies according to the ſeveral particular Methods of performing it; each of which we ſhall deſcribe in their proper Places. But here we ſhall only conſider what is neceſſary for the *Apparatus Minor*. Such as the particular kind of Biſtory or Scalpel, exhibited in *Tab.* XXVII. *Fig.* 8. or a Razor inſtead of it; which, together with the Hook (*Fig.* 10.) or a Pair of Plyers, will be ſufficient for the Purpoſe. But from Schaccus's Time, who wrote in the Year 1596, the more experienced Surgeons admit the Forceps into their Apparatus: which they always have in Readineſs, in Caſe the Hook and Fingers are not ſufficient for the Extraction. And indeed this Addition is a great Improvement of the ancient Method. For the Dreſſing, the T Bandage ſhould be at Hand, to be applied in the Manner repreſented in *Tab.* XXXVIII. *Fig.* 16. or *Tab.* II. *Fig. h.* To this may be added a thick and ſquare Compreſs, of about four Fingers breadth, ſome ſcraped Lint and ſtyptic Powder, or rather highly rectified *Sp. Vini*, which is much better for ſtopping the bleeding, when exceſſive. On the ſame Account it may be alſo neceſſary to have ſome crooked Needles and Thread, in Readineſs for taking up the larger Veſſels, which may happen to be divided. The Apparatus of Inſtruments and Dreſſing.

X. We have endeavoured to repreſent the moſt proper Poſture, for the Patient to be ſecured in for this Operation, when an Adult, in *Tab.* XXIX. *Fig.* 5. As likewiſe *Fig.* 9. and 10. of the ſame Plate: in the firſt of which Figures is repreſented the Situation of an adult Patient for Lithotomy, according to Alghish, a little different from the Method of Tolet: in the laſt is Poſture of the Patient.

[a] Celsus recommends to the Patient a wholeſome and thin Diet for ſome Days preceding the Operation: and that he ſhould exerciſe himſelf frequently with moderate Walking, to facilitate the Stone's Deſcent into the Neck of the Bladder.

exhibited

exhibited one of the open Ligatures, with which RAW uſed to faſten the Patient's Hands and Arms together. The Poſture of the Patient is deſcribed more at large in the fourth Number of the enſuing Chapter. But if a Child is to be cut for the Stone by this Method, he is to be tied in the Poſture juſt referred to, or ſecured in the ſame Manner by two Aſſiſtants, the ſtrongeſt of which ſhould be ſeated on a high Chair, holding upon his Knees a Pillow or Cuſhion, covered with a Linen Cloth three or four Times double, hanging over his Knees down to his Feet. Upon this Pillow the young Patient is to be ſeated, and ſecured, as we have repreſented in *Tab.* XXVIII. *Fig.* 1. from TOLET. The Lad thus placed, if he be ſtrong, another Aſſiſtant may hold his Arms, ſo that he cannot move: or if he be of a luſty Stature, or fourteen Years of Age, he may then be placed in the Poſture before repreſented in *Tab.* XXIX. *Fig.* 5. which is the ſeventh Table of TOLET.

The old Method of Lithotomy, by the *Apparatus Minor*, deſcribed.

XI. The Lad being thus moſt commodiouſly placed, the Surgeon then proceeds to perform the Operation; which in the old Method of Lithotomy by the *Apparatus Minor*, is done in the following Manner: Firſt, the Surgeon dips the Fore-finger [a] of his left Hand in Oil, and then introduces it into the *Anus* of the Patient, rightly diſpoſed and prepared, preſſing it forwards towards the *Os Pubis*; while with his right Hand he preſſes backward upon the lower Part of the Abdomen, on the Bladder, immediately above the *Os Pubis*. Having felt the Stone, he thruſts it to the left Side of the *Perinæum* near the *Anus*, and there holds it in his Fingers in ſuch a Manner that it forms a viſible Tumor *in Perinæo*. (See *Tab.* XXIX. *Fig.* 3. A.) This done, he makes an Inciſion upon the moſt prominent Part of the Tumor *in Perinæo*, with the Scalpel or Biſtory held in his right Hand, cutting down ſucceſſively through the Integuments upon the Calculus; and enlarging the Wound longitudinally, he at laſt divides the Bladder itſelf, in the ſame Direction, (BB) ſufficient for the Extraction of the Stone. It is neceſſary that the intervening Parts betwixt the Knife and Calculus be cleanly divided, without leaving any Adheſions; leſt the Extraction of the Stone ſhould be by that Means hindered, as it otherwiſe would be, eſpecially when a rough one: as alſo to avoid giving the Patient more than neceſſary Pain, and prevent a conſequent Inflammation, from lacerating and contuſing the nervous Parts. The Bladder thus divided, and the Knife laid aſide or given to the Aſſiſtants; if the Stone be ſmall, it may be thruſt out at the Wound by the Fingers *in Ano:* or if it be large and rough, its Extraction may be effected, partly by the Preſſure of the Fingers in *Ano*, and partly by applying the Hook B. See *Fig.* 6. *Tab.* XXIX. But if the Stone ſhould ſlide back again into the Bladder, or ſtick faſt in the Wound, it may be then drawn out by the Forceps.

What is to be done after the Operation.

XII. When the Stone has been thus extracted, it will be neceſſary to introduce the Finger, a Catheter, or Probe into the Bladder (*Tab.* XXVII. *Fig.* 11.) in order to make a diligent Search, whether there are any other of thoſe Con-

[a] In CELSUS's Method, the Surgeon introduces two Fingers into the *Anus*. ÆGINETA was the firſt, who directs the Uſe of the Fore-finger only; and that very properly, eſpecially in very young Patients, to prevent any Injury of the Inteſtine. *Lib.* VII. *Cap.* 60. He maintains likewiſe that this Operation may be performed on Adults as well as Children; and, inſtead of the lunated Wound of CELSUS, he recommends an oblique Inciſion; which is much eaſier.

cretions

cretions yet remaining in that Receptacle. For it is very frequent to find other Stones in the Bladder, when that extracted is of a ſmooth and poliſhed Surface, or when the Stone is broke in the Extraction. If there be any remaining, they ſhould be therefore carefully extracted by the Fingers, a Hook, Forceps, or Pliers, for this Purpoſe; and when all is found clear, the Operation is concluded, and the Patient put to Bed. But for the ſubſequent Dreſſing, Regimen, and future Treatment of the Wound; they may be managed according to the Directions we ſhall give in explaining the modern Method of Lithotomy, by the *Apparatus Magnus*, in the next Chapter.

XIII. It is to be obſerved that this ancient Method of Lithotomy, which we have been now explaining, being very ſimple in itſelf, is chiefly practiſed by Mountebanks and ignorant Operators; being quite laid aſide by all our modern and ſkilful Phyſicians and Surgeons, who have more dexterous and ſucceſsful Methods of cutting. However, I think this Method not only very practicable in Boys from ten to fourteen Years of Age, which is the Time limitted by CELSUS and ALBUCASIS for this way of operating, but alſo in younger Patients, and even in Adults, eſpecially of a ſhort Stature or lean Habit of Body; becauſe in them there is no great Difficulty in bringing the Stone to its proper Place *in Perinæo*. And the Simplicity of the Method is rather a Recommendation than a Diſparagement of it to us: eſpecially as it has been ſo long practiſed, with very good Succeſs, in young Subjects, not only for many Ages paſt by our Anceſtors, but alſo by ſeveral, in our modern or preſent Practice; and I myſelf and others have performed great Cures by it, in Adults, and even in ſome that were advanced in Years. See N°. 4. of this Chapter. For it has certainly this Advantage over the *Apparatus Magnus* of MARIANUS, and the *lateral Operation* of RAW and JAMES, that it can be performed with the feweſt Inſtruments, and often with nothing more than the Knife. In this way too the Urethra is not injured by paſſing the Catheter, nor the Bladder pinched by the Uſe of the Forceps or Plyers; whereas they are often very much hurt and lacerated by the Inſtruments uſed in the other Methods. The Stone is alſo readily found, and more eaſily and ſpeedily extracted than in the Operation of MARIANUS, and the lateral Method of Lithotomy, in which the Stone ſometimes cannot be found by the moſt expert Maſters. To which we may add, that in this way the Stone ſerves as a Guide and Foundation for the Surgeon to cut upon; and was what gave Birth to the lateral Operation now in Vogue. For CELSUS tells us (*Lib.* VII. *Cap.* 26.) that the Wound is to be made in the Integuments near the Anus, down to the Neck of the Bladder. And ALBUCASIS ſays the Stone is to be protruded to the Bottom of the *Os Iſchium*, where the Inciſion is to be afterwards made. I have therefore practiſed this Method of operating, with Succeſs, on young Subjects for many Years paſt; and at Times ſtill continue to do the ſame now. Alſo the experience MARIANUS would perſuade us ſtill to uſe this Method in Children, upon many Accounts, in his *Italian* Treatiſe of the principal Operations in Surgery. This Operation is alſo moſt eligible in ſome Caſes for Adults: as when the Urine is ſuppreſſed by a Calculus ſticking in the Neck of the Bladder, where it may be perceived, forming a Tumor *in Perinæo*, and can be neither diſcharged by Medicines, nor ſafely repelled by the Catheter. (See *Chap.* CXXXIX. preceding.) It may be alſo

Our Judgment on this Method.

allowed of in some other Cases, where the Stone gravitates towards the *Perinæum*, forming a Tumor, in which it may be sensibly perceived. Otherwise the *Apparatus Minor* is allowed, even by Celsus and Albucasis, its ancient Patrons, to be not without Danger in Adults; and especially in those of high Stature; because in them there is great Difficulty in bringing the Stone to its proper Place *in Perinæo*.

Concerning Nephrotomy.

XIV. Lastly, as there are many Cases in which a Stone in the Kidney can by no Means be resolved or removed by Medicines, and the Patient being continually in the most extreme Torture, is desirous by any Means to be freed; it may not be inconsistent with our Design in this Place, to resolve the Question, whether a Stone in the Kidney may not be cut out in such a Case. This is a Subject seldom treated of in Books of Surgery; and which I chuse to treat of in this Place, as the Operation may be performed by the *Apparatus Minor*, either with the Scalpel alone, or with the Hook and Forceps. The generality of those who have said any thing upon the Subject in their Writings, think it a Proposal too dangerous to be practicable, and therefore treat it with Neglect: when at the same Time there are extant many Arguments both from Reason and Experience, which recommend such a Practice to be absolutely necessary, especially under particular Circumstances. For we have many Instances of Patients who have been freed from the Stone in the Kidney, by a Wound in that Part, received accidentally in the Back[a]; and that in some Cases without any dangerous Symptoms. Among other Instances which have come under my own Observation, I shall only mention a late one, of a man who was wounded by another with a Knife, upon the Region of the right Kidney, in his Back, in the Year 1735, in such a Manner that Blood, and bloody Urine, was voided in great Plenty for several Days through the Wound, and through the Urethra: but after he was transmitted to my Care at *Helmstadt*, he was happily cured within the Space of four Weeks. It is therefore most certain, that Wounds of the Kidneys are not always mortal, as some have imagined, but frequently curable; especially those inflicted on the Back, without penetrating into the Cavity of the Abdomen. And Hippocrates[b], though he interdicts his Pupils from performing the Operation of Lithotomy, does yet direct them, in treating of Disorders in the Kidneys, *to make an Opening where they are elevated and tumified; that after extracting the Gravel, and discharging the Matter, they may be healed with Diuretics. For by such an Opening or Incision there may be Hopes of a Recovery; otherwise the Patient is a dead Subject.* And in the same Book (*Cap.* XVI. *tit.* 8.) he says, *When there is a Suppuration of the Kidney, and it forms a Tumor near the Spine; in that Case a deep Incision is to be made upon the Tumor near the Kidney, or* (as he says in another Place, *Cap.* XVIII. *tit.* 17.) *into the Kidney itself.* From whence it appears, that he did not think an Incision in this Part so greatly to be feared, as a Wound in the Bladder. Rossetus also, and the accurate Anatomist Riolan, and others, are induced, by many Reasons, to think that Nephrotomy may be often practised with Success; if the Incision be made in that Part where the Calculus is perceptible, taking care to avoid

[a] Many of which are collected by Wedelius *in Dissertat. de Lithotomia, Jenæ* 1714. See also Schenck. *Observat.* and Bohn. *de vuln. lethal.* p. 157.

[b] *Lib. de Intern. Affect.* Cap. XV. Tit. 19.

wounding the emulgent Artery, Vein, or the Ureter, and to prevent the Wound from penetrating into the Cavity of the Abdomen. But Nothing can be more reasonable than to perform Nephrotomy, when we are directed to it by Nature, pointing out the Place, by a Tumor and Abscess formed in the Loins from a Calculus in the Pelvis or Kidney. In such a Case we are also supported by the Advice and Authority of SCHENCKIUS, WEDELIUS, and MEEKREN; together with LAVATERUS, formerly an eminent Physician and Surgeon of *Helvetia*, with whom I amicably cohabited for some Time, in the Year 1710, he then practising Surgery at *London* with great Applause. He at that Time told me that he had not only performed this Operation with Success in the abovementioned Case, but had also publickly declared (in the last Page but one of a Treatise published in the Year 1708, at *Utrecht* on the Rhine, *de Atriteis & Hypospadiceis*) "I perform the Operation of Nephrotomy, on either of the "Kidneys, when Nature directs to that Practice by forming an Abscess." There is therefore no apparent Reason why this Operation should be condemned, under the forementioned Circumstances, as it is by a great many. I should rather advise, according to my own Practice, never to omit Nephrotomy, when Nature thus points out the Road to it: since the Life of the Patient may be frequently not only this way preserved, but also freed from the Torture and excruciating Pains excited by the Calculus, which may be thus freely extracted by the Fingers, a Hook, or a Pair of Plyers. For more on this Subject consult FONTANUS, *exempl.* 42. *fol.* 117. HILDANUS, *Cent.* IV. *Obs.* 44. TULPIUS, *Lib.* IV. *Obs.* 28.

CHAP. CXLI.

Of Lithotomy *by the* Apparatus Major.

I. FROM the preceding Account of Lithotomy by the *Apparatus Minor*, it appears to be practicable with Ease and Expedition. But there are many Cases, especially in Adults, as MARIANUS and HILDANUS have rightly observed, where that Method would be both dangerous in its Consequences, and difficult in the Performance, or even impracticable. For when the Stone is unequal and rough-surfaced, (which is often the Case, and is sometimes judged to be so from the Frequency of bloody Urine, and the most painful Sensations; and sometimes by introducing the Fingers into the Rectum, or the Catheter into the Bladder) the Patient is not only tortured with extreme Pain by forcing it to the Side of the *Perinæum* in the Operation; but the Roughness of it will also frequently occasion a violent Inflammation and consequent Gangrene. The Inequality of the Stone also frequently causes the Incision upon it to be so uneven as to render its Extraction thereby difficult; so that many bad Consequences must necessarily follow. To which may be added, that the Surgeon is sometimes liable to hurt the Rectum, or his own Fingers[a]; whence it will

The Reason of its Invention.

[a] Though this Accident sometimes happens to an imprudent and careless Surgeon, it may be generally avoided by the more dextrous and expert.

be very difficult to ſuſtain and feel the Stone, ſo as to cut upon it. If the Patient alſo be large and corpulent, the Magnitude of the Bladder and its Diſtance from the Anus may render it difficult to protrude the Stone to the Side of the *Perinæum:* and it will be ſtill much more difficult to retain it firm in that Situation, becauſe of the Slipperineſs of the Bladder and Rectum. To which, if we add the Smoothneſs of the Stone's Surface, and the Aptneſs of the Surgeon's Finger to be cramped, or to be tired, and incapable of holding out, it will evidently appear that this Method of Lithotomy muſt be in many Caſes both hazardous and impracticable. Not to inſiſt upon the Poſſibility and Danger of wounding one of the *veſiculæ Seminales*, on the left Side, ſo as to impair in a great Meaſure the Patient's Sufficiency for Procreation. Theſe and other Inconveniences eſpecially that the *Apparatus Minor* is only practicable in Infants, and that Adults of a larger Size could not conveniently be cured by it, has induced the Surgeons of the ſixteenth Century, about the Year 1520, to invent another Method of cutting for the Stone, with new Inſtruments; which was then, and has ſince continued to be practiſed with great Succeſs. Inſomuch that the moſt expert Surgeons, eſpecially thoſe of *France*, have generally preferred it to the more ſimple and ancient Method, by the *Apparatus Minor*; except, as we before intimated, when the Calculus is lodged in the *Perinæum*, or ſticks faſt in the Neck of the Bladder or poſterior Part of the Urethra, ſo that it can neither be repelled back again, nor diſcharged forward. The Invention of this new Method of Lithotomy by the *Apparatus Major*, is aſcribed to a celebrated *Italian* Phyſician of *Cremona*, FRANCISCUS DE ROMANIS, *vel* ROMANO. Whoſe Method was afterwards improved and publiſhed by one of his Scholars, MARIANUS SANCTUS, in a Treatiſe of a barbarous Stile *de Lapide veſicæ per inciſionem extrahendo.* Venet. 8^vo. 1535. and afterwards at *Paris*, 4^to. 1540. Since when it has been denominated, from its Improver and firſt Deſcriber, MARIANUS's *Method of Lithotomy*; and from the larger Number of Inſtruments uſed in it, the *Apparatus Magnus*, or *Major*. But of late, ſince we have had other Methods introduced, it has been termed the *vulgar* or *old* Method.

The Occaſion of inventing this Method.

II. The firſt Invention of this Method ſeems to me to have aroſe from an Obſervation, how eaſily large Stones are frequently voided from Women, either naturally, without any Aſſiſtance, or by Art with an extracting Force. For ROMANUS, its firſt Author, conſidering the Shortneſs and great Dilatability of the Urethra in Women, giving an eaſy Paſſage to a Stone, either ſpontaneouſly, or with the Help of Inſtruments, imagined that if an Opening was made into the Urethra of Men, near the Bladder, ſo as to leave the intermediate Part of it as ſhort as in Women, that then it might be dilated, and the Stone extracted with equal Eaſe[a]: for to cut into the Bladder, was at that Time eſteemed mortal, and therefore criminal, from the Authority of HIPPOCRATES, *Aph.* 18. *Lib.* VI. and CELSUS *Lib.* VI. *Cap.* 26. And if we rightly conſider the Caſe, the male Subject is, by this Operation, with regard to the Urethra, converted into a female, and ſo treated as ſuch. For in this Method, a longitudinal

[a] Though M. FALCONET, a Phyſician at *Paris*, in a Diſſertation on the lateral Operation, thinks it was not the Author's Intention to cut into the Urethra, but into the Neck and Bladder itſelf. Which Opinion is moſt probable, the Reader may preſently judge.

Inciſion

Inciſion is made *in Perinæo*, extended from the *Scrotum* towards the *Anus*; which, as it were, reſembles the Entrance of the *Vagina*, or at leaſt ſerves inſtead of it in the preſent Caſe: the *Urethra* is then opened *in Perinæo* from the Letter D to F or I, *Tab.* XXIX. *Fig.* 1. So that there remains but a ſhort Part of the *Urethra* intire, between the Lips of the Wound and the Bladder, as from I to L, like as in Women: which Part being ſufficiently dilated with proper Inſtruments, the Stone may be extracted by convenient Hooks or Plyers out of the Bladder. To anſwer this Intention, it was therefore neceſſary for the Inventor to contrive a Set of Inſtruments, by which the whole might be dextrouſly performed. Accordingly he firſt invents a grooved Catheter to make an Inciſion ſafely in the *Urethra*; afterwards Directors and Dilators, to make way into the Bladder; and, laſtly, Forceps for the Extraction of the Stone. All which were at that Time, as appears from MARIANUS, but very imperfectly and indifferently fitted for their Offices, as we uſually find in the Beginning of almoſt all Inventions: but in Proceſs of Time they have received various Improvements and Advantages, ſo that at the preſent Day they ſeem to have acquired a great degree of Perfection. Though ſome of the Inſtruments employed in the *Apparatus minor* may be alſo uſed in this Method.

III. In performing Lithotomy by the *Apparatus major*, the following Inſtruments are chiefly neceſſary. Firſt, Catheters, made of Silver or Copper, of various Sizes and Diameters, according to the different Age and Make of ſeveral Patients, in order to ſearch for, or find out the Stone, as we before directed in *Chap.* CXXXVII. § III. See alſo our Explanation in *Tab.* XXVII. *Fig.* 2, 3, 4, and 5. in treating of the *Apparatus minor*. But in this Apparatus there are alſo required grooved Catheters made of Steel of various Sizes, according to the Age or Bulk of the Patient. See *Tab.* XXVII. *Fig.* 12, 13, 14, 15. To theſe we may add the Scalpel, *Fig.* 8. or particular Kind of Knife for dividing the Parts by Inciſion in Lithotomy; which, at the Time of uſing it, ſhould be wrapped up in Linen in the Manner repreſented in *Fig.* 9. leaving its Point only uncovered. Two enſiform Directors or Conductors, (*Tab.* XXVIII. *Fig.* 2. and 3.) one of which has a Beak, marked A, and called *male*; the other being termed *female* B; and the Handles of both are repreſented by the Letters CC. Some prefer the more ſimple and excavated Conductor of HILDANUS, *Fig.* 4. termed a *Gorgeret*[a] by the *French*; which is approved of as more commodious by ſome, and diſapproved of by others. It will be alſo neceſſary for the Lithotomiſt to be provided with a peculiar Sort of Forceps, *Fig.* 5, 6, 7. of different Sizes and Figures, ſome being ſtraight at the Mouth, as *Fig.* 5. others incurvated, as *Fig.* 6. together with a Kind of Hook repreſented in *Tab.* XXVII. *Fig.* 10. which is ſmooth on the external Surface next the Bladder, but rough and unequal on that Part, which is to intercept the Stone. To this ſhould be alſo added a Kind of oblong Spoon, *Fig.* 11. AA. being furniſhed with a Button or round Head B, to be uſed inſtead of a Probe: the Inſtrument is by ſome termed *Lapidillum*, and by MARIANUS *Verriculum*, becauſe it ſerves to extract the ſmall Fragments of Stones from the Bladder. Laſtly, in order to dilate the Wound, when the Stone is exceeding large, it is the Practice of ſome to uſe an

Neceſſary Apparatus of Inſtruments for this Method.

[a] Which has been long ago deſcribed and figured by P. FRANCUS in Lib. *de Hernijs*.

Inſtrument called a *Dilatator*. Of this Inſtrument there are ſeveral kinds; but as it is ſeldom uſed at preſent, I have only exhibited one of them in *Tab.* XXVIII. *Fig.* 8. [a]. The ſeveral Inſtruments now mentioned are by ſome fixed in a ſort of a Caſe or Pouch hanging before 'em, and faſtened round their Waſte, as in *Tab.* XXIX. *Fig.* 9. *lit.* H. Others place them in a Diſh full of warm Water, in ſuch Order as may be moſt commodious for uſing them in the Operation; or elſe they only dip the Inſtruments in hot Water before they are thus diſpoſed for Uſe. It will be alſo neceſſary to be provided with a Sponge and warm Water, leſt there ſhould be occaſion to clear away the Blood from the Wound, after making the Inciſion: And the Surgeon ſhould be defended with an Apron and Sleeves to keep his Clothes clean. The Apparatus for dreſſing may be the ſame as we before directed for the *Apparatus minor*; *viz.* ſcraped Lint, the T Bandage, and a thick ſquare Compreſs, upon which may be laid the Biſtory, or Scalpel, for the Operation, as in *Tab.* XXIX. *Fig.* 9. Add to theſe, ſome highly rectified Spirit of Wine, or ſtyptic Powders, for reſtraining the Hæmorrhage, if the Flux of Blood ſhould be too conſiderable; alſo ſome ſmall crooked Needles and Thread, for taking up the bleeding Arteries, according to the Advice of Mr. CHESELDEN: and laſtly, a Cup with Olive-oil, in which ſome of the Inſtruments are to be dipped, in order to lubricate them, and make them paſs into the Bladder with more Eaſe.

An EXPLANATION *of the* TWENTY SEVENTH PLATE.

Fig. 1. Repreſents the Copper or Silver Pipe called a *Catheter*, which is chiefly uſed in Women for diſcharging the Urine in a Suppreſſion, and to ſearch for the Stone.

Fig. 2, 3, 4, 5. Are Silver Catheters of various Sizes, to be applied for the ſame Purpoſes in male Subjects, according to the different Age and Size of the Patient's Body. The Letters AA denote the Handle of the concealed Silver Wire, whereby it is to be drawn out of the Cannula, when that may be neceſſary; BB the two oblong Apertures at the Extremity of the Inſtrument, which admit the Urine to be diſcharged; CC the Handles of the Catheters.

Fig. 6. Repreſents a Silver Catheter which is flexible, which is ſometimes very neceſſary and convenient to be left in the Bladder and Urethra to diſcharge the Urine, when another Catheter muſt be introduced ſeveral Times ſucceſſively, as when the urinary Paſſage is totally occluded by ſome Calculus, *&c.* in which Caſe the flexible Catheter may prevent an Inflammation of thoſe Parts, by repeated Introductions of the other Inſtrument. The Letters A, B, C, denote the ſame here as in the preceding Inſtrument.

Fig. 7. Repreſents a Silver Catheter of another kind, which is without the Lateral Apertures; having only one opening at its End marked A, which is ſhut by the pyriform Button marked B, which is in a manner the End of the included Wire. If the Handle of the Wire C be preſſed forwards, the Button comes out in the manner repreſented by D in the adjacent Figure, by which

[a] Others may be ſeen in MARIANUS, ANDREAS A CRUCE, PAREY, P. FRANCUS, TOLET, DIONIS, LE DRAN, &c.

means

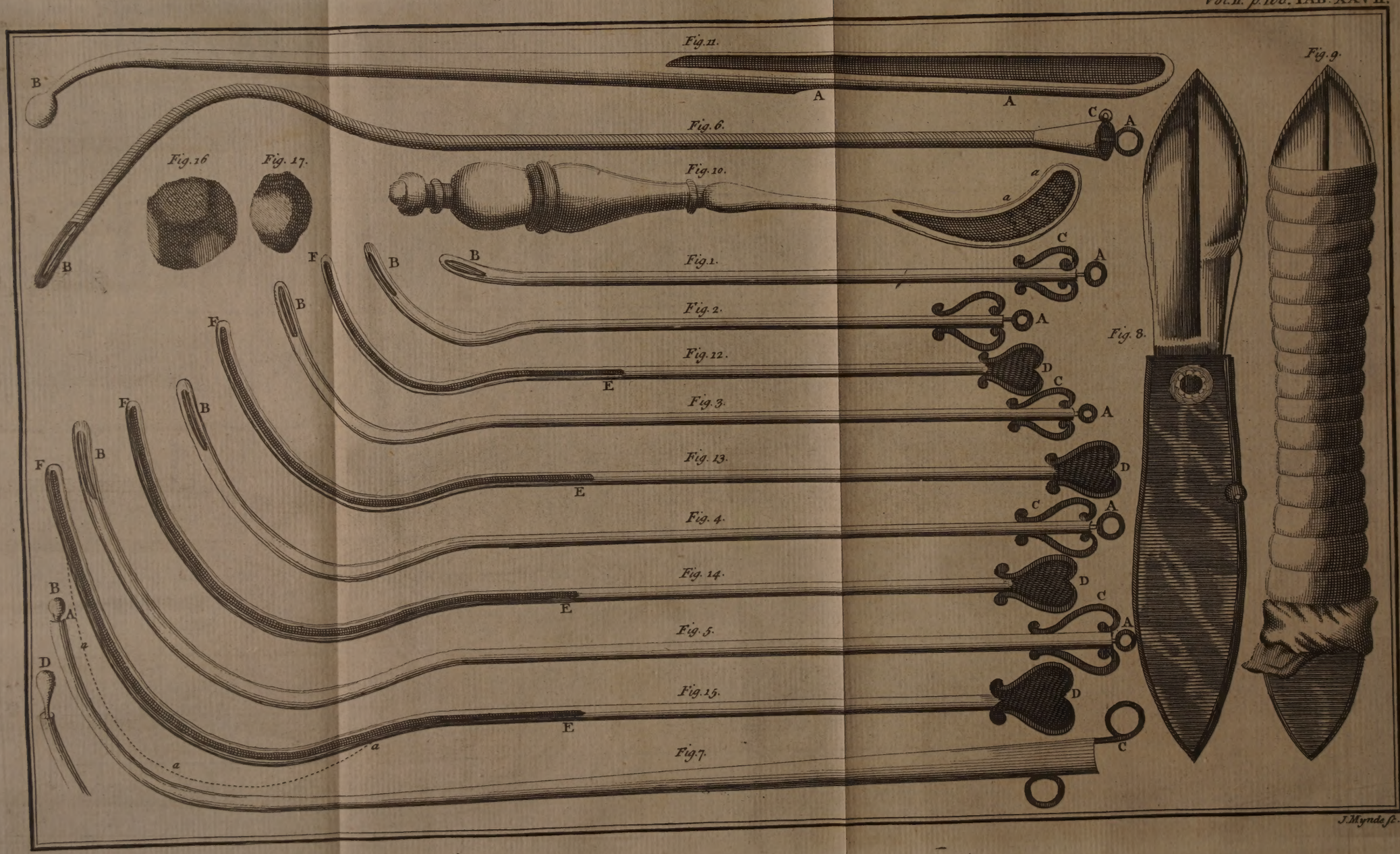
Fig. 11.
Fig. 9.
Fig. 6.
Fig. 16
Fig. 17.
Fig. 10.
Fig. 1.
Fig. 2.
Fig. 8.
Fig. 12.
Fig. 3.
Fig. 13.
Fig. 4.
Fig. 14.
Fig. 5.
Fig. 15.
Fig. 7.
A
B
C
D
E
F
a
J. Mynde sc.

means the ſuppreſſed Urine will enter by the Mouth of the Catheter, and be conveyed out of the Bladder.

Fig. 8. Is a large Scalpel, or Biſtory, opened and naked, ſuch as hath been hitherto moſt in Uſe for the Operation of Lithotomy; it is by ſome termed *Lithotomus*.

Fig. 9. Is the ſame Inſtrument, furniſhed with a Piece of narrow Linen wound round it, in ſuch a manner as not to leave an Inch of the Edge uncovered, ſufficient to make the Inciſion.

Fig. 10. Is the Hook which is ſometimes neceſſary for extracting the Stone in the ſeveral Methods of Lithotomy; it being furniſhed with ſmall Teeth in its concave Part, for the more firmly holding or retaining the Calculus.

Fig. 11. A Steel Inſtrument having an oblong, but narrow Spoon at one End; and being round at the other, is alſo furniſhed with a round Button, which may perform the Office of a Probe and Director, which is often uſed with various Intentions for the Stone in the Bladder by the Lithotomiſts.

Fig. 12, 13, 14, & 15. Denote Steel and grooved Catheters, which are commonly uſed in cutting for the Stone by the *Apparatus major*, that the Knife may be guided into the Groove. DD repreſent their Handles, EF their Grooves.

Fig. 16, 17. Are two Stones of an unuſual Size, which I ſucceſsfully cut out of a Sacculus, or Hernia, in the Urethra before the Scrotum.

IV. The ſeveral neceſſary Inſtruments being thus provided, the next Buſineſs is to diſpoſe and ſecure the Patient in a proper Poſture for the Operation; that he may not injure himſelf, and obſtruct the Operator by his irregular or obſtinate Motions. In moſt Hoſpitals, where this Operation is very frequently performed, they are provided with a particular kind of Table for this purpoſe, repreſented in *Tab.* XXVIII. *Fig.* 9. the Manner of placing the Patient upon which, is repreſented from the *Italian* Lithotomiſt ALGHISH, in *Tab.* XXIX. *Fig.* 9. Sometimes a proper Chair is uſed inſtead of the Table, one or two of which is figured by TOLET in his Treatiſe of Lithotomy, but are not very often uſed at the preſent Day. But if one of theſe Chairs is not at hand, a common oval or ſquare Table of about four Feet long, and three broad, will be ſufficient for that Purpoſe, placing thereon a kind of Seat to be raiſed or depreſſed to ſupport the Patient's Back, as in *Tab.* XXVIII. *Fig.* 9. The Patient is to be placed in ſuch a Manner on the Edge of this Table marked B, that he may ſit as in a Chair, his Back being ſupported by the inclined and moveable Part of the Table marked C. His Thighs are then to be bent and diſtended in ſuch a Manner that his Heels may touch his Buttocks AA; and his Knees being divaricated, his Hands are held faſt about his Hams as RAW adviſes, or near his Ancles, to which it may be proper to ſecure them by Ligatures in ſuch a Manner that he cannot eaſily move himſelf (ſee *Tab.* XXIX. *Fig.* 9. & 10.) as we ſhall relate more particularly in explaining that Table. Poſture of the Patient.

V. It is generally neceſſary to provide three or four ſtrong and courageous Aſſiſtants to ſecure the Patient firmly in a proper Poſture for the Operation. See *Tab.* XXIX. *Fig.* 9. Two of theſe Aſſiſtants repreſented by CC, are to ſecure Poſture of the Aſſiſtants.

cure the Patient's Legs on each Side, in ſuch a Manner as to hold his Foot faſt in one Hand, and his Knee in the other, drawing it at the ſame Time to one Side. The third Aſſiſtant is to ſtand behind, and keep the Patient down on his Back cloſe to the Table: and the fourth is to ſtand on the right Side of the Patient, or on the Table, in ſuch Manner as to hold up the Scrotum with one Hand, and to hold the Catheter, upon Occaſion, with his other. A fifth Aſſiſtant may ſtand on the right Side of the Surgeon, that he may hold in Readineſs, give and receive the ſeveral Inſtruments neceſſary for Lithotomy. Sometimes three Aſſiſtants will be ſufficient for this Purpoſe, diſpoſed in the Manner repreſented by *Fig.* 9. *Tab.* XXIX. from Alghish: that is, two Aſſiſtants ſhould hold the Extremities on each Side, and the third ſtride a-croſs the Table, ſo as to hold the Patient betwixt his Legs and thighs; and for the drawing up the Scrotum, *&c.* as before. At the Extremity of the Table near the Surgeon ſhould be placed a Veſſel to receive the Blood and Fæces that may be diſcharged from the Patient: and near the ſame ſhould be alſo placed a Cup of Oil, and a Pan of hot Water to warm the Inſtruments, and lubricate them before they are paſſed into the Bladder; as alſo waſh off any Sand or Filth from them, and to cleanſe the Wound from its extravaſated Blood by means of a Sponge. Theſe ſeveral Neceſſaries being made ready, the Surgeon may then enter on his Work in the following Manner.

The Manner of operating or cutting.

VI. In the firſt Place the Surgeon is to put off his Coat, if it will be any Incumbrance to him; and having dipped the End of one of the Steel grooved Catheters in Oil, fizable to the Patient, he then introduces it through the Urethra into the Bladder, according to the Directions given in Chap. CXXXVI. § III. and therewith ſearches a ſecond Time, to ſee if he can find a Stone: leſt the firſt Tryal ſhould deceive him, as it ſometimes does. If then the Sugeon and his Aſſiſtants are ſatisfied of a Stone being concealed in the Bladder, the convex Part of the Catheter is thereupon turned in the Bladder and Urethra towards the left Side of the Perinæum: but the Handle of the Inſtrument, together with the Penis containing it, is gently inclined towards the right Side or Inguen; in which Poſture the Surgeon uſually orders it to be held by one of the Aſſiſtants, whoſe Office is to hold up the Scrotum. By this means the convex Part of the Catheter elevates that Part of the Perinæum and Urethra, which are to be divided in the Operation, and renders them ſufficiently obvious both to the Eye and Touch. This done, the Surgeon raiſes the Integuments of the Perinæum with the Fingers of his left Hand, and draws them towards the right Side of the Patient. In his right Hand the Surgeon at the ſame time holds the Knife bound round with a piece of Linen (as at *Fig.* 9. *Tab.* XXVII.) in the ſame Poſition as we generally hold a Pen in writing, and therewith makes a longitudinal Inciſion downwards, in the middle of the Perinæum, near the *Raphe*, or Suture, thus dividing thro' the *Membrana adipoſa*, till his Finger can perceive the Catheter in the Neck of the Bladder and Urethra; which is then to be divided perpendicularly downward, in ſuch Manner that the End of the Scalpel may paſs in the Groove of the Catheter: becauſe in this Method of performing Lithotomy, only the Urethra is to be divided, and the Neck of the Bladder left entire. Thus by paſſing the Scalpel in the Groove of the Catheter, there will be no Danger of wounding Parts which would be improper to be divided. Some begin

gin their Inciſion near the middle of the Perinæum, and continue it downward; others make their Inciſion from below upward towards the Scrotum: but I think the laſt Method is not ſo often practiſed. The external Orifice of the Wound made is to be larger or ſmaller, in Proportion to the Patient's Habit of Body, and Size of the Stone to be extracted; but it is generally made about two Fingers Breadth in Children, and three or four in Adults: and the Inciſion in the Urethra, internally, is continued (ſee *Tab.* XXIX. *Fig.* 1.) thro' the Bulb E from D, to the Beginning of the Neck of the Bladder F or I [a]. But when the Surgeon is going to divide the lower Part of the Urethra, his Hand and Knife are to be inclined; while, according to the Direction of Meſſ. CHESELDEN and LE DRAN, the End of the Catheter, which had been hitherto preſſed downward, is now to be elevated or preſſed ſtrongly againſt the Symphyſis, or Angle of the *Oſſa Pubis*. By which means the *Urethra* is drawn as much as poſſible from the *Inteſtinum rectum*; which, without this Precaution, might eaſily be wounded. At the ſame Time Care ſhould be alſo taken to prevent the Point of the Knife from ſlipping out of the Groove of the Catheter. Some Lithotomiſts commit the Integuments of the *Perinæum* to be divaricated by the aſſiſting Surgeon, who holds up the *Scrotum*, holding the Catheter in its proper Direction with their own Left-hand. But in this reſpect the Surgeon may act as Conveniency and Diſcretion may direct him.

What is to be done with the Conductors after the Inciſion.

VII. A ſufficient Opening being thus made by Inciſion, the Knife is then returned by the Surgeon to the Aſſiſtant, who firſt gave it; at the ſame Time diligently obſerving the Groove of the Catheter: in which, if it be held by an Aſſiſtant, he keeps the Nail of the Fore-finger or Thumb of his Left-hand. The Lithotomiſt then takes a Male-conductor from his Pouch, or the Hand of an Aſſiſtant, and after dipping it in warm Oil, ſlides the End of it cautiouſly thro' the Groove of the Catheter into the Bladder: which done, he extracts the Catheter. Some leave the End of the Knife in the Groove of the Catheter, which is in that manner held by an Aſſiſtant, 'till they have thereby guided the End of the Conductor into the Groove of the Catheter; becauſe it would otherwiſe be a difficult Matter, eſpecially in fat Subjects, to paſs the end of the Conductor into the Groove of the Catheter, which would be covered and obſcured by the Protuberance of the fat. The Male-conductor being thus introduced thro' the Groove of the Catheter into the Bladder, a female Conductor is alſo introduced upon the former, by its Sulcus B, (*Tab.* XXIX, *Fig.* 2, 3.) being guided on the ſharp Back of the other, ſo as to paſs eaſily and ſafely into the Bladder thro' its Neck. This done, the two Conductors are gradually divaricated from each other by their own Handles CC; and the Neck of the Bladder being by that means dilated, a Pair of ſtrait Stone-forceps, which have been firſt warmed and dipped in Oil, are carefully introduced cloſe ſhut betwixt the Conductors into the Bladder: by which means the Neck of the Bladder is again in ſome meaſure further dilated. My own Practice is to thruſt the Fore-finger of my Right-hand, dipt in Oil, betwixt the two Conductors, before introducing the Forceps: thus I gently dilate the Neck of the Bladder, for the more eaſy Entrance of the Forceps. It is a certain Sign that the Forceps are

[a] The Poſition of the Bladder and Urethra is accurately deſcribed for the Uſe of the Lithotomiſt by MORGAGNI in *Adverſ. Anat.* III. *pag.* 82 & 97.

paſſed into the Bladder, if you find they will eaſily open: but if they will not yet open, 'tis a ſign they are not in the Bladder, but muſt be introduced further thro' its Neck. Some of the Surgeons of *Paris* introduce the Fore-finger of their Right-hand into the Bladder, upon the male Conductor, before they introduce the female one; and then, by inverting the Conductor, and turning its Edge downwards, they endeavour to dilate its Neck. But Le Dran wiſely obſerves, that the ſtrict Neck of the Bladder is ſo filled with the Conductor, that the Finger cannot be alſo haſtily introduced through it, as ſome do with Precipitation, without endangering a Laceration, and the moſt excruciating Pain: and therefore the firſt Method is, in my Opinion, the more adviſeable. Others, again, proceed in a different Method, uſing only the ſingle cannulated or grooved Inſtrument, called by the *French* a *Gorgeret*, (*Tab.* XXVIII. *Fig.* 4.) inſtead of the two Conductors beforementioned. Theſe, having firſt made an Inciſion as before, paſs the End of the *Gorgeret* thro' the Groove of the Catheter into the Bladder, as we directed for the male Conductor: only ſome help forward the Inſtrument with the Fore-finger. The *Gorgeret* being thus introduced into the Bladder, if it contains any Urine, it runs out thro' the Groove of the Inſtrument, which is alſo a ſure Mark of its being paſſed into the Bladder. The Catheter is then taken out of the Urethra, and the *Gorgeret* gently turned round on every Side by the Surgeon, in order to dilate gradually the Neck of the Bladder: then taking the *Gorgeret* by the Handle BB, in his Left-hand, he carefully introduces the ſhut Forceps with his Right-hand, through the Groove CC, into the Bladder.

Le Dran's Obſervations

VIII. Le Dran, who prefers and uſes the *Gorgeret* before the other enſiform Conductors, having paſſed that Inſtrument into the Bladder, gently thruſts the Fore-finger of his Right-hand thro' the Wound into the Groove of the Inſtrument; and therewith dilates the Neck of the Bladder for the more eaſy Paſſage of the ſhut Forceps, which he afterwards introduces through the Groove of the ſame Inſtrument: though indeed the ſame Practice was deſcribed before Le Dran by one of my own Pupils [a]. But he was probably the firſt who obſerved, from morbid Diſſections, that the whole Neck of the Bladder was almoſt conſtantly ſlit or lacerated, as well as expanded by the Method of dilating in the *Apparatus major*; notwithſtanding it was often attended with no bad Conſequences, eſpecially when done cautiouſly and gradually. For by that means the Forceps not only meet with a more eaſy Paſſage into the Bladder, but the Stone itſelf may be alſo extracted afterwards with much more Eaſe, and leſs Danger. The ſlitting or lacerating the Neck of the Bladder, and proſtate, by a gradual and gentle Dilatation, was the leſs to be feared; inaſmuch as without it there conſtantly appeared, in the dead Subjects who had ſuffered this Method of Lithotomy, a more dangerous and dreadful Laceration, occaſioned either by the more violent Intruſion of the Forceps, Dilatation of the Parts, or Extraction of the Stone [b].

Lithotomiſts are not agreed as to all the Parts which ought to be divided in making their Inciſion for the *Apparatus major*. The Generality of them are for dividing the *Urethra* only, without at all cutting the Bladder itſelf, or its Neck:

[a] Rosa, in Diſſert. de Calculo Veſicæ, *Argentorat.* Ann. 1723.

[b] See his Parallel of the different Methods of performing Lithotomy.

in

in which Opinion we find TOLET, and many others. But we before obſerved, in § II. of this Chapter, that M. FALCONET is of Opinion, that the Authors of this Method of Lithotomy intended and deſigned, that the Neck, and even the Bladder itſelf, ſhould be inciſed in the *Apparatus major*, as they are uſually in the *Apparatus minor*. M. NOEL ſays expreſly, that "the Neck of the Bladder is the "Part where the Inciſion is conſtantly made in this Operation; and that Bro-"ther JAMES's Method differs from the *Apparatus major* only in the Parts ex-"ternally divided." So alſo we find, that M. ROSA orders the Sphincter, that is, the Neck of the Bladder, to be divided in the *Apparatus major*, p. 23. and SCHAFFERUS [a] writes, that, in this Method of Lithotomy, not only the Neck, but alſo Part of the Bladder itſelf, ſhould be inciſed.

IX. When the Forceps are introduced into the Bladder, after the Conductors are extracted, they are to be ſtrongly opened ſeveral times to dilate the Opening; and then ſhutting them cloſe together again, the Stone is to be gently ſearched for [b]. While the Surgeon is ſearching for the Stone with the Forceps, he ſhould keep them ſhut cloſe all the Time, leſt ſome Part of the Bladder ſhould be intercepted and pinched by them: for which Reaſon too, the Jaws of the Forceps ſhould be of ſuch a Make, as not to meet cloſe at their Extremity, as may be ſeen in the Forceps repreſented in *Tab.* XXXI. *Fig.* 12. When the Stone is found, the Forceps are to be opened by applying both Hands dexterouſly, ſo as to lay hold of the Stone in ſuch a manner, if poſſible, that one Jaw of the Forceps may be underneath it, and the other above: the Advantages of which have been remarked by LE DRAN (*pag.* 65.) The Stone, being thus held faſt in the Forceps, is to be preſſed downwards towards the Rectum; and by gradually inclining the Forceps from one Side to the other, it is to be cautiouſly extracted downward, becauſe the Parts more eaſily dilate and yield that way than upwards, from the Reſiſtance of the *Oſſa Pubis*. Thus the Stone is often eaſily and ſpeedily extracted, when it is not very large, or rough: but when it is of an unuſual Size, or an unequal and prickly Surface, the Taſk proves difficult. But if the Stone cannot well be intercepted by the Forceps, becauſe of its Concealment in ſome Cell or Fold of the Bladder, as it frequently happens towards the *Rectum*; in that Caſe the Surgeon is to introduce the two firſt Fingers of his left Hand into the *Anus* of the Patient, to thruſt the Stone into the Forceps, that it may be well ſecured in them, ſo as to be extracted without further Difficulty. But if the Stone adheres to the upper Part of the Bladder behind the *Oſſa Pubis*; the inferior Part of the Abdomen is to be preſſed downward with the Hand, that the Stone may be more commodiouſly intercepted and extracted by the crooked or ſtraight Forceps. If the Stone lodges on the right or left Side of the Bladder, it may often be laid hold of, and extracted more conveniently by the crooked Forceps repreſented in *Tab.* XXVIII. *Fig.* 6. But to prevent the Stone from being broken by a too ſtrong Compreſſion with the Forceps, it may be proper to thruſt the Finger and Thumb of the left Hand on each Side the Stone betwixt the Forceps, to preſerve the ſame: for it is always much better to extract the Stone whole, when that is practicable, than to break it into Fragments. If the Stone cannot be readily found by the Forceps, LE DRAN

Uſe of the Forceps.

[a] Apud MEYERUM in Obſ. Chirurg. de Lithot. pag. 73 & 74.
[b] Diſſert. de variis Lithotomiæ generibus. *Argentorat.* Ann. 1724. pag. 7.

takes them out of the Bladder, and introduces his Finger, by which he places the Stone in a fit Poſition at the Neck of the Bladder; and then, by laying hold of it with the Forceps, extracts the ſame.

How the Forceps are to be managed when they open too wide.

X. If the Handles of the Forceps marked DD. *Tab.* XXVIII. are too much divaricated, after laying hold of the Stone, it cannot then be well extracted without great Danger of violently lacerating the Bladder, particularly its Neck, and the proſtate Gland. Therefore the Cauſe of this too wide opening of the Forceps is to be more particularly ſearched for: which may be beſt done by introducing the Finger, or, when that is impracticable, the kind of Probe armed with a Button, *Tab.* XXVII. *Fig.* 11, 13. With this the Lithotomiſt is to ſearch, betwixt the Jaws of the Forceps, whether or no the Stone, being of an oval or oblong Figure, is not held in the Forceps tranſverſly, or lengthwiſe. If the Stone be in this Poſition in the Forceps, it is to be let looſe, and again taken hold of by them in its leaſt Diameter; which may be done by the Direction of the Finger, or the forementioned Inſtrument, whereby it may be extracted with much leſs Danger and Difficulty than before. But if, notwithſtanding all this, the Stone continues to open the Forceps very wide, the Surgeon is then to uſe his beſt Endeavours to extract the ſame. In order to which, he is to take hold of the two Handles DD in his right Hand, and graſping that Part of the Forceps next the Wound with his left Hand, he is then to pull the Forceps and Stone gradually from one Side to the other downwards: becauſe the lower Part of the Wound more eaſily dilates than the upper, having none of the Reſiſtance of the *Oſſa Pubis*. But if the Stone proves ſo large as to reſiſt the Size of the Wound, and all the Surgeon's Endeavours for its Extraction entire, it ſhould then be broke to pieces by a large pair of Forceps with Teeth, repreſented in *Tab.* XXVIII. *Fig.* 7. which may be full as large again as the Figure: and thus the Stone may be extracted one piece after the other. But laſtly [a], if the Stone is ſo hard and compact, as well as large, that it cannot be extracted nor broke to pieces by the Forceps, as we are told formerly happened to Profeſſor Borrichius [b]: then the Caſe is deplorable, being generally fatal, as it was to him. A prudent Surgeon will, in ſuch a Caſe, leave the Stone in the Bladder, and heal up the Wound, or elſe leave it a Fiſtula, through which the Urine may be diſcharged, rather than torture the Patient to no Purpoſe, by forcing the Forceps to ſuch a Degree, that he dies in the Operation, which was the Caſe of Borrichius. Some Lithotomiſts, but few with Succeſs, make uſe of a ſteel Inſtrument to dilate the Wound, commonly termed a *Dilatator*, reſembling that in *Tab.* XXVIII. *Fig.* 8. But the Inſtrument has not been thought ſafe and convenient enough to be brought into Uſe among our modern Lithotomiſts. For it can hardly ever be uſed, to make any conſiderable Dilatation, without violently contuſing and lacerating the Parts; which, being very nervous and ſenſible, the Pain, already very great, becomes ſtill more excruciating, and is often followed with a violent Inflammation, a Gangrene, and a cancerous Diſpoſition, or other moſt malignant Symptoms. Sometimes the Stone cannot be compreſſed with Force enough to break it by the Forceps, becauſe it lies too near the Hinge or Flexure of the Inſtrument, *Tab.* XXVIII. *Fig.* 5.

[a] Celus (*Lib.* VII. *Cap.* 26. *N.* 3.) tells us, that Ammonius was the firſt who adviſed breaking the Stone.

[b] In the Account of his Life among the more Illuſtrious Chemical Writers.

Therefore

Therefore it may, in that Case, be proper to press back the Stone nearer to the Extremity of the Jaws of the Forceps, by introducing the button End of the Scoop, *Tab.* XXVII. *Fig.* 11. B. or in its stead, the fore Finger. To prevent the Forceps from being apt to hold the Stone too near their Hinge, it may be proper to have them made smooth in that Part, having Teeth only at their Extremity, as we have represented in *Tab.* XXVIII. *Fig.* 5. & 6. *litt.* A & B. by which means the Stone will of itself slide from the Hinge, and stick only at the Teeth, towards the Extremity of the Forceps. M. Francus de Franckenau does indeed take notice [a] of a Machine that was used by a Lithotomist at the *Hague*, instead of a Forceps for extracting the Stone, which was composed of Whalebone and an Ox's Bladder, whereby he endeavoured to avoid the Injury offered to the Bladder and other Parts by the common Forceps; but he neither describes the proper Size and Structure of the Instrument, nor the Manner in which it was used.

Other Observations.

XI. But if it happen that the Stone after a long Search cannot properly be laid hold of, or if it so often elude the Forceps, as not to be extracted in convenient Time (which has been the Case with very eminent and experienced Men; particularly Raw and Friar James) the Patient growing weak he must rest awhile to recover his Strength. And if he be seized with fainting Fits, Convulsions, or a Delirium; the Surgeon should for this Time desist entirely, rather than torture the Patient and perhaps destroy him. After he has lain in Bed for some Hours, and been refreshed with strengthening and comforting Medicines, the Operation may be again attempted, the Patient being situated as before. Thus the Stone very often, being propelled in the interim by the Bladder and Urine towards the Wound, is extracted without Difficulty. This is confirmed by the Testimonies of Albucasis, P. Francus, Hildanus, Toletus, and others: and I myself have experienced the same happy Effects. You should never harrass the Patient beyond his Strength, lest he die under the Operation.

What is to be done after extracting the Stone.

XII. When a Stone has been extracted agreeably to the Directions preceding, the Surgeon should then, especially if the Stone has a smooth Surface, introduce his Fore-finger, or the probe End of the Scoop beforementioned, in order to search whether any other Stone or Fragment be yet remaining in the Bladder, which could not well be determined before the Operation. If there be more Stones yet remaining, the Forceps are to be again introduced into the Bladder, either with the Finger, or the Conductors, and the Extraction of them made in the Manner which we have but now explained. And thus the Lithotomist is to continue, till the Bladder is cleared. If Gravel only, or some small Fragments of the Stone be found remaining, they may be more commodiously extracted by the oblong Spoon or Scoop, *Tab.* XXVII. *Fig.* 11. A. Or, if the Patient be very weak, and almost spent in the Operation, the Expulsion of them may be left to Nature: for the Urine generally discharges and washes out what fabulous Matter and Fragments of the Stone are left after the Operation. When the Bladder has in this Manner been carefully cleansed, it is the Practice of some Surgeons to insert a large Tube, *Tab.* II. *Fig. P.* either flexible or inflexible: others insert a Tent into the Wound, over which they apply a Plaster, Compress,

[a] In Act. Eruditor. Lipsiens. *Ann.* 1726. pag. 42.

and

and the Bandage T; thinking by that Means more effectually to cleanſe the Bladder from Sand or other Fœces. But it is the Advice of myſelf and others, with Brother JAMES and RAW, to inſert nothing in the Wound, and that for very good Reaſons. For without a Tube, Tent, or any thing of the like Nature, the Blood, Sand, and other Fœces are waſhed freely away by the Urine which flows through the open Wound: whereas they would be retained by the Uſe of thoſe Things, and the Wound would be probably thereby converted into a Fiſtula, attended with very bad Symptoms. In extracting the Stone, it ſometimes ſlips out of the Forceps, and lodges in the Wound; in which Caſe we ſhould immediately endeavour to lay hold of it again without extracting the Forceps; but if they are already out of the Wound, the two fore Fingers dipt in Oil ſhould be inſtantly introduced into the Patient's Anus, in order to preſs the Stone towards the Mouth of the Wound, and then to extract it cautiouſly by the Uſe of the Forceps or a Hook.

An EXPLANATION *of the* TWENTY EIGHTH PLATE.

Fig. 1. Repreſents the Manner in which the Male Child is to be ſecured for the Operation, according to the Direction of CELSUS and TOLET: which, in my Opinion, ſeem to be neither very proper nor convenient.

Fig. 2 and 3. Repreſent the enſiform Conductors, which are, by many Lithotomiſts, uſed in the *Apparatus major*, and in the lateral Operation. That at *Fig.* 2. is furniſhed with a ſmall oblong and obtuſe Beak A, and is thereby denominated *Male*; the other at *Fig.* 3. *litt.* B. has a Groove, and is generally termed the *female* Director.

Fig. 4. Exhibits the concave or cannulated Conductor, called by the *French* a *Gorgeret*, which is by moſt Lithotomiſts generally preferred to the two preceding. A is the Beak of the Inſtrument, which is tranſmitted through the Groove of the Catheter; BB its cruciform Handle; CC its Channel or Groove through which is paſſed the Finger, and then the Forceps into the Bladder.

Fig. 5. A *Volſella*, or Pair of ſtraight Forceps for extracting the Stone out of the Bladder (of which kind it is neceſſary to have ſome larger) furniſhed with Teeth within the Extremity of their Mouth.

Fig. 6. A Pair of the ſame Forceps crooked, ſerving to take hold of the Stone, when it is lodged on one Side of the Bladder.

Fig. 7. Repreſents a Pair of large Forceps furniſhed with large and ſharp Teeth of a pyramidical Figure, fitted for breaking large Stones within the Bladder. But the Inſtrument may be as large again as the Figure, to exert the greater Force.

Fig. 8. Repreſents the Inſtrument termed a *Dilatator* by the Generality of Surgeons, being the moſt ſimple of the Kind deſcribed by any Author, and ſerving to dilate the Wound made in Lithotomy: though the Inſtrument is at preſent hardly ever made uſe of. The Beak A, like a Crane's Bill, is inſerted into the Wound; and the two Arms (BB) being preſſed together, the Beak of the Inſtrument opens by means of the Hinge marked C.

Fig.

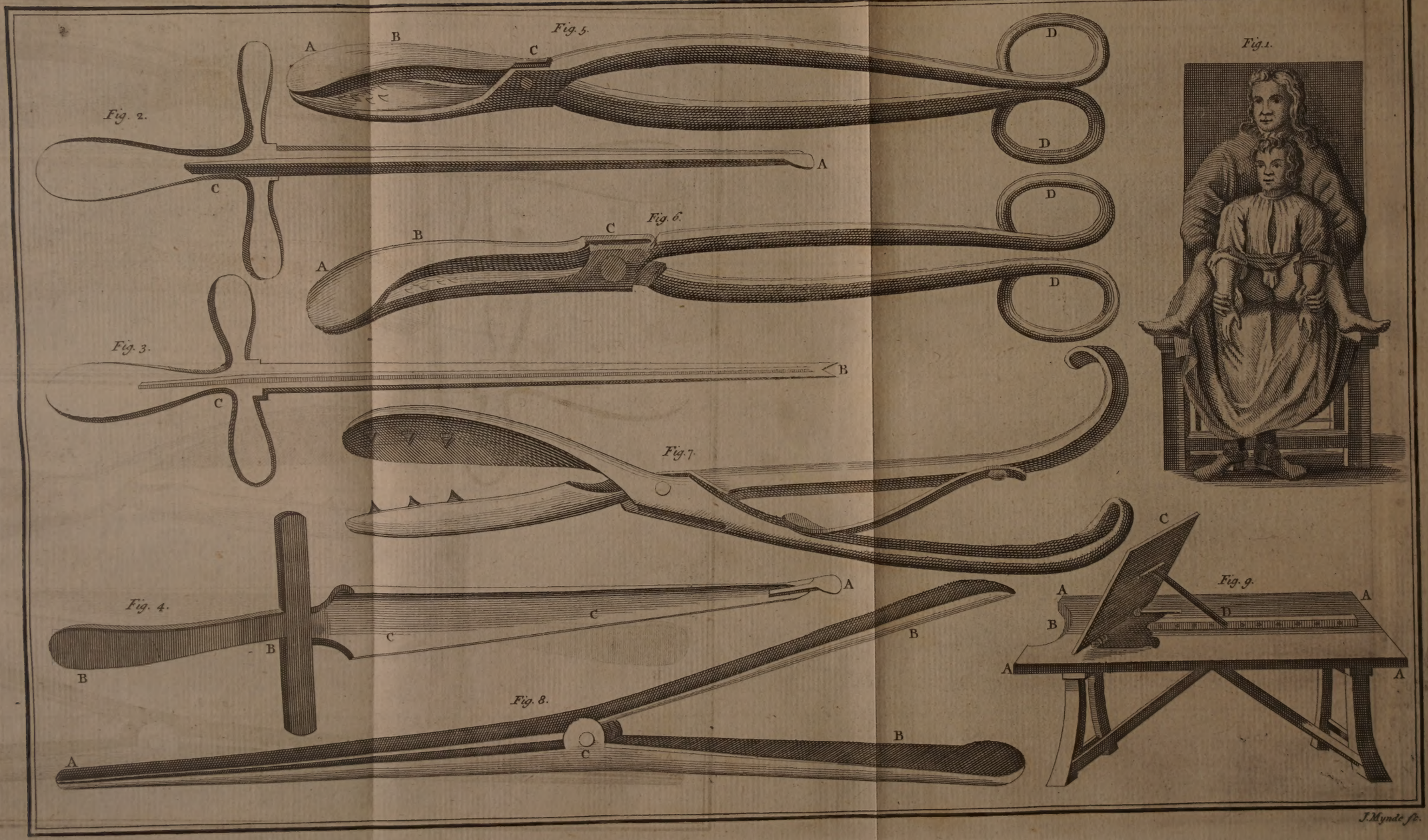
Fig. 5.
A
B
C
D
D
A
C
Fig. 2.
Fig. 6.
B
C
A
D
D
Fig. 3.
B
C
Fig. 7.
Fig. 1.
C
Fig. 9.
A
A
B
D
A
A
Fig. 4.
A
C
C
B
B
B
Fig. 8.
B
A
C

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Fig. 9. Shews a commodious Table adapted for performing the Operation of Lithotomy, marked at each Corner with the Letters AAAA. The Letter B denotes the Place upon which the calculous Patient is to be ſeated, being made hollow, or ſemilunar, that the two Angles AA may the more commodiouſly ſupport the Feet. C the Prop for ſupporting the Patient's Back; which, for the greater Conveniency, is capable of being elevated or depreſſed more or leſs, to raiſe the Patient higher or lower, as the Surgeon may ſee proper, by means of the iron Rod marked D.

XIII. We have already explained the Manner in which the Operation is to be performed, and Stone extracted by the Surgeon. It therefore now only remains for us to deſcribe the Dreſſing and Regimen, and to propoſe a few Cautions. The Patient's Wound being cleanſed with a Sponge, and the Ligatures untied, he is firſt of all to be placed immediately in a Bed, covered with an Oil-cloth, or one that has been waxed: over which may be laid a Linen-ſheet folded together immediately under the Patient, to prevent the Bed and Pillow from being ſpoiled by the Blood and Urine diſcharged from the Wound, for a few Days after the Operation. The Patient being in this Manner properly diſpoſed, the Wound is to be dreſſed with ſome Doſſils of ſcraped Lint. If the Patient be ſtrong, and his Wound bleeds, it may be proper to let it continue ſo for a while, in order to reſtrain or prevent an Inflammation, as Celsus adviſes. But if there be too large a Profuſion of Blood, which ſeldom happens, it is to be prudently reſtrained, by applying Pledgits of Lint dipt in the beſt, or moſt highly rectified Spirit of Wine, or ſome other ſtyptic Liquor: or the Wound may be ſprinkled with ſome proper ſtyptic Powder, and the Arteries compreſſed with the Fingers till the Hæmorrhage ceaſes, or becomes inconſiderable. The Pledgits of Lint are then to be covered with a Linen Bolſter, and a large ſquare Compreſs, but without any Plaſter; ſecuring the whole Dreſſing by applying the T Bandage, (*Tab.* II. *Fig. b*). or that with four Heads, *Fig. d.* If theſe means prove inſufficient, the Bleeding Arteries may be tied up with a crooked Needle and Thread [a]. Nor does it ſeem to be an improper Practice among the *French* Surgeons, who at Intervals anoint the *Scrotum*, *Perinæum*, and Part of the Abdomen, for the firſt four Days with the *Ol. Roſar.* and then cover the Parts with Linen Rags dipt in *Oxycrate*, before they apply their Bandage: Others only apply *Oxycrate* with large Compreſſes to the Abdomen. Many Surgeons are for making a ſtrict Bandage upon the Parts at the firſt dreſſing though there be no conſiderable Hæmorrhage: becauſe, ſay they, the Agglutination of the Wound will by that means be more eaſy and expeditiouſly performed. Others, on the contrary, will have the Bandage to be made very ſlack for the firſt few Days; that whatever Parts of Gravel, Fragments of the Stone and Blood may remain in the Bladder, might by that means have a free Paſſage through the Wound. And others, for the ſame Reaſon, adviſe, with the celebrated Raw, to uſe no Bandage at all; except too great a Profuſion of Blood may

Manner of Dreſſing after the Operation.

[a] Colotus (*Lib. de Lithotomia*, pag. 131.) relates, that he ſtopt an Hæmorrhage of this kind, that would yield to no other Means, by repeated Phlebotomy, to the Number of three times within the ſpace of Four and Twenty Hours: He alſo adviſes Phlebotomy in ſuch Caſes to be continued *ad Deliquium Animi*.

make a Bandage neceſſary for the firſt few Days. They who are for the ſtrict Bandage after dreſſing the Wound, faſten the Patient's Legs together at his Knees; leſt, by opening his Thighs, the Agglutination of the Wound might be impeded. But they who follow the laſt Method are in my Judgment moſt in the right, who apply ſuch a Bandage the ſecond or third Day after the Operation: leſt any Gravel, concreted Blood, or Fragments of the Stone, being retained in the Bladder, might prove a Baſis for the Formation of more Stones.

Regimen after the Dreſſing.

XIV. After the Dreſſing, the Patient ſhould be ſupplied with Plenty of Ptiſan, *Decoctum Hordei*, a ſtrengthening Emulſion, and a quieting Draught; not ſo much to compoſe him to ſleep, as to recover his Strength, and to cleanſe or waſh out what Relics of the Stone, Gravel, or concreted Blood may remain in his Bladder. His Diet ſhould be ordered the ſame as uſual for People in Fevers, or that have ſuſtained great Wounds: that is, in the Beginning a Ptiſan, or *Decoctum Hordei*, made pleaſant with ſome cooling Syrup, for his ordinary Drink. Afterwards, if no Fever comes on, or if it is over, he may be permitted to drink ſmall Ale, or rather Wine well diluted with Water; at the ſame Time ſtudiouſly avoiding every thing ſalt or ſharp, ſpicy, or too much heating the Blood. The Air of the Patient's Bed-chamber ſhould be neither hot nor cold, but as temperate as poſſible. If the Patient ſhould complain of an unuſual Heat and ſlight Fever, ſome Blood ſhould be taken from him, a Gliſter adminiſtred, and cooling Medicines taken inwardly. Theſe Difficulties being ſurmounted, we may judge the Patient to be in a fair Way, and have great Reaſon to expect a Cure. But if, on the contrary, a cold Chill and Horror ſeizes the Patient on the third, fourth, or fifth Day, followed by an intenſe Fever, Nauſea, Vomiting, Hiccoughs, and convulſive Motions; or if the Wound does not kindly ſuppurate, but becomes dry; we may thence be generally pretty certain that Death will follow. At firſt the Wound may be dreſſed once or twice in a Day with ſcraped Lint, and ſome digeſtive Unguent, as is uſual in other Wounds: over the ſcraped Lint ſhould be applied, and ſecured by Bandage, a large Compreſs dipt in Warm Spirit of Wine, Oxycrate, or ſome proper Fomentation, to prevent an Inflammation of the Parts. After the third or fourth Day the Surgeon may in my Opinion ſafely venture to tighten the Bandage, and retain the Parts a little cloſer together; which ſhould be done gradually one Day after another. When a good Suppuration and Union of the Parts has ſucceeded, the Wound may be dreſſed with ſome vulnerary Balſam; ſuch as the *Balſ. Capiv.* and Liniment *Arcei*, made very warm, and applied with ſcraped Lint inſtead of the digeſtive Ointment uſed before, ſecuring the whole dreſſing carefully with ſome ſticking Plaſter, and Compreſs on each Side. This way of dreſſing ſhould be continued twice a Day, till the Lips of the Wound are united: after which a good Cicatrix may be procured, by dreſſing once in a Day with dry Lint only, applying a Plaſter over it. The Agglutination of the Wound may be alſo much promoted by the Patient's keeping his Thighs cloſe together, and by lying as much as poſſible on his right Side as is cuſtomary. This being obſerved for ſome Time, the Patient may then turn himſelf, and lie on either Side, or on his Back, at Pleaſure, provided he lies ſtill, and keeps his Thighs cloſe together: to do which the better and more effectually, it is often neceſſary, eſpecially in Children, to bind the Thighs cloſe to each other,

and

and command them to keep ſtill in the Bed. Nor ought the Patient to be ſuffered to riſe, and walk about before the Urine diſcharges itſelf all by the common and natural Paſſage of the Urethra, and the greateſt Part of the Wound is healed up, as before; which is ſometimes performed within the ſpace of eight Days in Children, where the Stone has not been large and difficult to extract. Afterwards, walking may be ſo far from hindering the Urine from diſcharging itſelf the right Way, that it may ſometimes promote the ſame, and not indiſpoſe the Wound for healing. Nor will it be improper for the Surgeon to compreſs the Wound with his Hand, about ſix or ſeven Days after the Operation, in order to ſee if the Urine will diſcharge itſelf by the natural Paſſage of the Urethra, if it does not take that Courſe of its own Accord. As often as the Linen is made wet and foul with the Patient's Urine, it ſhould be changed for clean, if poſſible, to prevent an Ulceration of the adjacent Parts.

XV. Laſtly, I ſhall conclude upon this Method, by propoſing a few Cautions for the ſake of Beginners, which are very neceſſary to be known and obſerved. Sometimes a corrupt, ſpongy, or fleſhy Subſtance is extracted together with the Stone, which is then a Sign of ſome Abſceſs, Caruncle, or fleſhy Excreſcence formed within the Bladder. If the Catheter cannot be paſſed into the Bladder of an Adult, who has preſumed to undergo the Operation, from whatever Cauſe it may proceed, whether an Inflammation in the Neck of the Bladder, a Caruncle, violent Phimoſis, or a Stone impacted into the Neck of the Bladder: in ſuch a Caſe the Operation ought either to be performed according to the old Method, by the *Apparatus minor*, cutting upon the Fingers; or elſe, according to PETER FRANCUS, to make the Inciſion above the *Oſſa Pubis*, as we ſhall hereafter direct more at large. If a Prolapſion of the *Anus* or *Rectum* ſhould be occaſioned from the Strainings cauſed by the violent Pain of the Stone, in the Beginning of the Operation, (as it often happens) it may be again replaced by the Finger after the Operation is finiſhed, if it be inconſiderable: but if the Prolapſion be great, the Inteſtine ſhould be immediately replaced, and ſuſtained by an Aſſiſtant with a Compreſs, to prevent its being wounded. But if this Accident ſhould happen in the Middle, or towards the End of the Operation, the replacing of the Inteſtine may be deferred till the Operation is over; when, upon a Ceſſation of the Pain, it uſually recovers its own proper Situation, which may be otherwiſe aſſiſted with the Fingers. If the Operation is to be performed upon one who has been cut before, then the Inciſion is to be made directly in the old Wound, or Cicatrix. Nor ſhould the external Wound be ever made too ſmall, leſt the Extraction of the Stone ſhould be thereby rendered difficult, eſpecially as we are aſſured from Experience, that a large Inciſion heals as ſoon, and as kindly, as one that is ſmaller[a]. But when the Stone is impeded in its Extraction by the Opening being too ſmall, the Wound ſhould be enlarged in the moſt convenient Part of it, either by the Knife or Sciſſars. But if notwithſtanding the Stone proves too large to be extracted, 'tis much better to deſiſt, than to kill the Patient by too violent a Cautions.

[a] The making a large Inciſion was alſo approved of by CELSUS, ALBUCASIS, ÆGINETA, and others of the Ancients before the Moderns.

Treatment. If the crooked Forceps are to be introduced into the Bladder, it ſhould be with the End of them pointing upwards; though the ſtraight Forceps will generally ſuffice. Inſtead of the common Biſtory (*Tab.* XXVII.) thoſe may be alſo uſed to Advantage, which are repreſented in *Tab.* XXXI. *Fig.* 8. and 18. The Time in which the Wound heals, after the Operation, is various, being ſometimes within the ſpace of fifteen or twenty Days, and ſometimes four or five Weeks, according to the Patient's Habit, and other Circumſtances. When the Forceps of any kind are introduced into the Bladder, it ſhould be done with the Direction of the Finger, the Conductor, or the Handle of the Scoop which has a Button; leſt, by miſtaking their Way, they might injure the Bladder, and Parts adjacent. If the Stone appears to be flat or plain, it ſhould be rather taken hold of by the Forceps in its upper and lower Part, than by its Sides. Laſtly, if the Patient ſhould be afflicted with violent Pains in his Bladder after the Operation is finiſhed, it will be convenient to inject ſome warm Milk, or other Decoction through the Wound by a Syringe into the Bladder. But if the Injury may be reaſonably ſuppoſed to proceed from the Roughneſs or Largeneſs of the Stone contuſing the Bladder; it may then be proper to fill the Bladder with *Aq. Hordei*, or a Decoction of ſome vulnerary Herbs, made warm, and mixed with ſome *Mel Roſar.* or elſe warm French Wine, in which Myrrh has been boiled, with the Addition of ſome *Mel Roſar.* For the reſt, I would adviſe the Surgeon not only to conſult TOLET, GREENFIELD, ALGHISH, and other Writers, before he undertakes the Operation; but alſo to call in the Advice of ſome prudent Phyſician. For the Conveniency and Advantage of this Method of Lithotomy above the reſt, the Reader may peruſe LE DRAN's *Parallele des Methodes*, &c. On the contrary, this Method is rejected by GARENGEOT (*in Oper. Chirurg.*) and DENYS (*in Obſerv. Chirurg.*) as it alſo was before them by DOUGLAS in his Treatiſe of the High and Lateral Operation, as alſo by CHESELDEN and MORAND, where they treat on this Method. Even LE DRAN himſelf, who ſtood up ſo ſtrongly for the *Apparatus major*, has ſince changed his Opinion. In his chirurgical Operations, publiſhed in 1743, he wholly diſcards the *Apparatus minor*, *major*, and *altus*; and prefers the lateral Method, which he now practiſes.

An EXPLANATION *of the* TWENTY NINTH PLATE.

Fig. 1. Repreſents the *Urethra* of a Male Subject (freed from the other Parts of the *Penis*) together with the Bladder, proſtate Gland, and *Inteſtinum Rectum*, all viewed on their left Side, and figured as much as poſſible to the Life, ſo as to exhibit the natural Diſpoſition of them, as they appeared in a Lad of fourteen Years of Age. A the Glans Penis; BCDEF the Urethra in its natural curve Poſition; E the Bulb of the Urethra; F a Part of the Urethra, termed membranous; G the Body of the Bladder itſelf; H its *Fundus* or Bottom; IKL the Neck, or Entrance of the Bladder, inveſted with the proſtate Gland, and denudated in its muſcular Fibres, which compoſe the *Sphincter veſicæ*, to render it more conſpicuous. I is the beginning or *Apex* of the Gland; K the Body of it; L its Extremity, or Margin next the Bladder. MN denote the *Fundus*, or lower Part of the Bladder next the *Inteſtinum Rectum*,

Fig. 1.

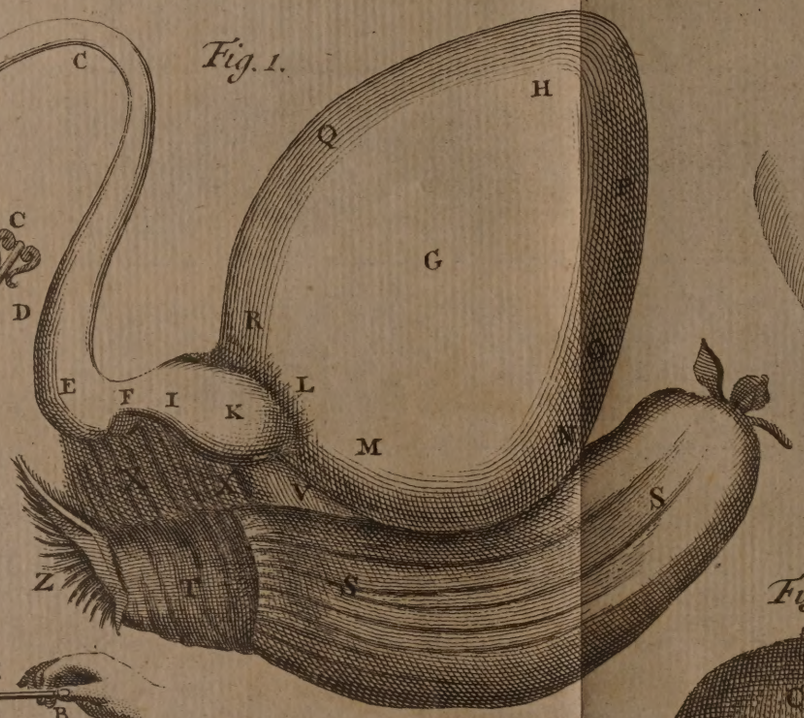

Fig. 4.

Fig. 5.

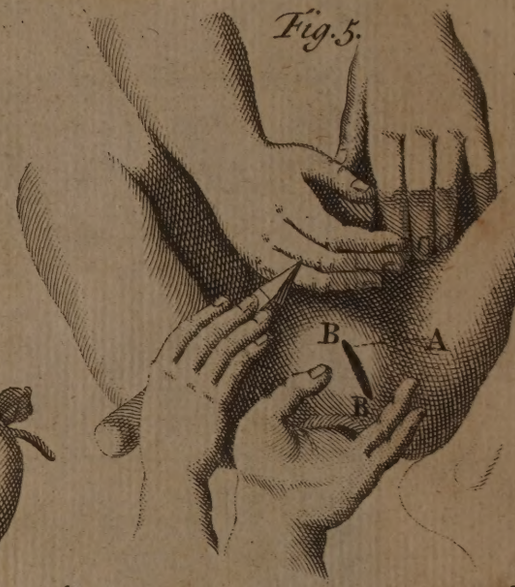

Fig. 6.

Fig. 3.

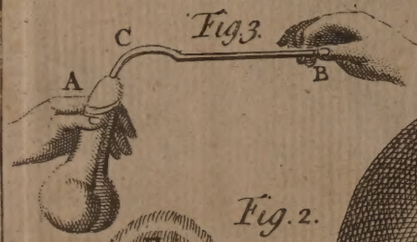

Fig. 2.

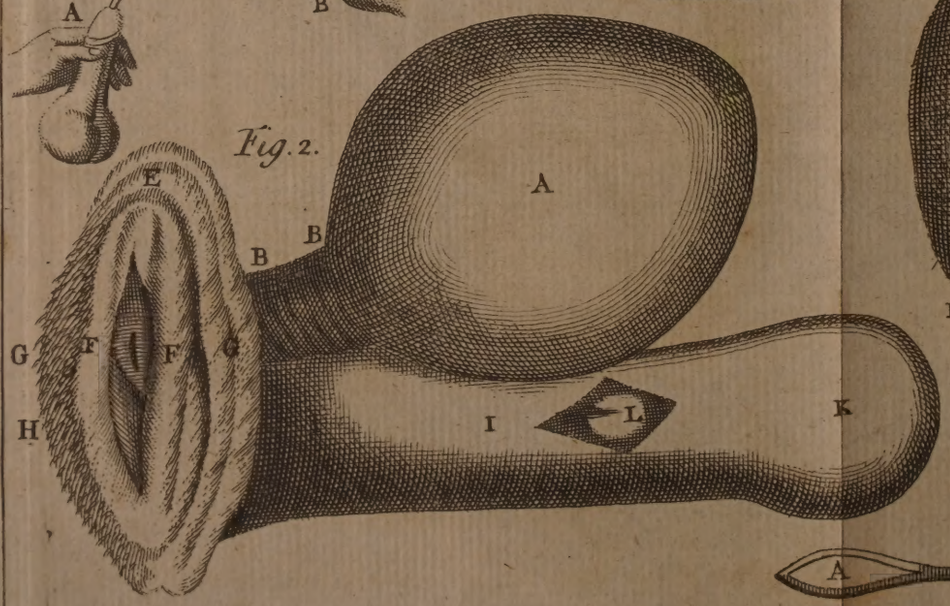

Fig. 8.

Fig. 9.

Fig. 10.

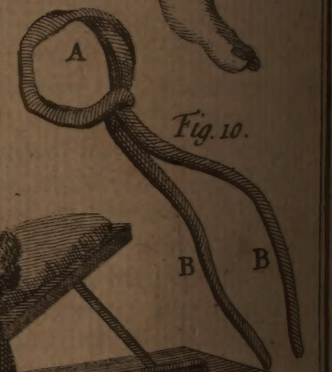

Fig. 7.

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ctum, in which is formed the left *Sinus*, or Cavity, which often impreſſes itſelf into the Rectum, ſo as to conceal or intercept the Stone. N O P denote the back Part of the Bladder, which lies next to the *Os ſacrum*, and Cavity of the Abdomen, being covered with the Peritonæum. Q R is the anterior Part of the Bladder in our erect Poſition, but the uppermoſt when we lie down: 'tis this Part which is divided in the high Operation, being not inveſted with the internal Lamina of the Peritonæum, but quite free and excluded from the internal Cavity of the Abdomen; whereas the Parts of the Bladder marked N O P H Q are immediately inveſted with the Coat of the Peritonæum, and lie next the Cavity of the Abdomen, as may be plainly perceived by inflating or injecting ſome Liquor into the Bladder of a dead Subject. But, concerning this, we ſhall be more particular in our Explanation of the ſucceeding Table. S S denote the *Inteſtinum Rectum* connected to the Bladder; T the *Sphincter Ani*, or Muſcle deſtined to cloſe the Mouth of the *Rectum*. V is Part of the left ſeminal Veſicle; X X the Interſtice betwixt the *Inteſtinum Rectum*, Bulb of the Urethra, and Neck of the Bladder, filled partly with the *Membrana adipoſa*, and in Part compoſed of muſcular Fibres detached from the Sphincter and elevating Muſcles of the *Anus*.

Fig. 2. Repreſents the Poſition of the Bladder and *Urethra* in Women, as they are ſeen on the left Side, together with their Connection to the *Uterus* and *Vagina*, taken from ALGHISH. A denotes the Bladder; B B its Sphincter Muſcle, including the *Urethra* marked C C. D the external Mouth or Entrance of the *Urethra* at the *Vagina*; E the *Clitoris* and its *præputium*; F F the *Nymphæ*; G G the *Labia pudendi*. H repreſents the *Os Uteri externum*, or Entrance of the *Vagina*; I I the Body of the *Vagina*; K the *Uterus* itſelf. L ſhews the *Os Tinæ*, or internal Mouth of the *Uterus* ſeen through a lateral Slit made in the *Vagina*.

Fig. 3. Shews the Manner in which the Catheter is to be introduced into the Urethra, and afterwards paſſed into the Bladder. A denotes the Surgeon's left Hand elevating the Penis; B his right Hand thruſting the Catheter into the Urethra, in ſuch a Manner that the convex Part of the Catheter looks towards the Back of the Penis, and the Abdomen.

Fig. 4. Denotes the Poſition into which the Catheter is to be turned in the Urethra, when it has reached the Bulb of the Urethra marked E in *Fig.* 1. it is to be then inverted, ſo that A the concave Part of the Inſtrument may be next the Abdomen, and the Extremity of it, marked B, gradually inſinuated thro' the Neck of the Bladder into its Cavity. C denotes the Handle of the Catheter by which it is to be guided in paſſing it.

Fig. 5. Exhibits the ancient Method of Lithotomy deſcribed by CELSUS, performed by introducing the two fore Fingers into the *Anus*: whereby the Stone and Neck of the Bladder are thruſt outward in the *Perinæum*; and the Inciſion B B is then made upon the Stone in the moſt prominent Part of the *Perinæum* marked A. The Figure is taken from TOLET's Treatiſe on Lithotomy: but the Place and Figure of the Inciſion is added by myſelf.

Fig. 6. Shews the Method of extracting the Stone marked A, by the Hook B, when it ſticks in the Wound, ſo as not to be extricable by the Forceps or Fingers; taken alſo from TOLET.

Fig. 7. Is a Braſs Inſtrument of MARIANUS, adapted to extract Stones out of the Urethra. A denotes that Part of the Inſtrument which is to be inſinuated into the *Urethra* behind the Calculus; B the round Ring or Handle by which the Inſtrument and Calculus are to be then drawn out of the *Urethra.*

Fig. 8. Repreſents an anterior View of the Bladder taken out of a Lad. AA denote the Neck of the Bladder, and Beginning of the Urethra. BB the Body of the Bladder, C its *Fundus* with the adjacent Part of the *Urachus*; DD the proſtate Gland inveſting the Urethra; EE the ſeminal Veſicles, in Part viſible on each Side, which in Adults are more protuberant, and extended up to FF; where being hollow internally, there is a Sort of *Sinus* formed in the Bladder on each Side, in which the Stone often lies concealed: they may be therefore not improperly called the *Sinus's* of the Bladder, which are yet wanting in the Bladders of Infants and Children. The Figure of the Bladder in Adults is therefore ſomewhat different from that in Children. The Bladder indeed reſembles the Form of a Pear in both of them; but with this Difference, that in Children the Apex of the Pear is downwards toward the Urethra, as in this Figure; but in Adults the Apex of the Pear is upwards, the Bladder being broadeſt downward in them, as may be ſeen in *Fig.* 1. of this Plate, and in *Fig.* 1. and 2. of *Tab.* XXXII.

Fig 9. Repreſents the Manner in which the adult Patient ſhould be placed and held for Lithotomy, according to ALGHISH; which is in Part different from the Method of TOLET, and other modern Operators. A denotes the Poſture of the Patient; and B the Surgeon, as he holds the Catheter in his left Hand, and the Inciſion Knife in his Right. CC two of the Aſſiſtants, who are placed on each Side of the Table, to ſecure the Patient's Limbs, holding the Foot in one Hand, and the Knee in the other; D the Aſſiſtant who kneels upon the Table, and by ſtriding over the Patient, keeps his Body from riſing or moving, while with his Hands he draws up the Scrotum, and extends the Skin of the Perinæum. EE a Cuſhion placed under the Patient; F a Veſſel placed beneath the Patient to receive the Blood, and perhaps the Fæces, diſcharged in the Operation; G denotes the Part of the Perinæum in which the Inciſion is to be made. H the Caſe or Pouch for containing the Inſtruments, to be faſtened about the Waiſt of the Operator; this is repreſented by itſelf in *Tab.* XXX. *Fig.* 6.

Fig. 10. Exhibits one of the open Ligatures with which RAW uſed to faſten the Patient's Hands and Legs together. A the Loop for containing the Wriſt; BB its two looſe Ends to be faſtened round the Leg: of which ſee more hereafter.

CHAP.

CHAP. CXLII.

Of Lithotomy by the Apparatus Altus, *or the high Operation of* PETER FRANCUS, *whereby the Stone is extracted by an Inciſion in the Hypogaſtric Region, above the* Oſſa Pubis.

The Origin and Hiſtory of this Method.

I. BESIDES the two preceding Methods of Lithotomy by the *Apparatus Major* and *Minor*, practiſed by our modern Surgeons, we alſo meet with a third Method propoſed and deſcribed in their Chirurgical Writings; which is aſcribed to one PETER FRANCUS, a French Surgeon, as its firſt Inventor. After him it has been denominated *Methodus Franconica*. From the Place of Inciſion being in the Middle of the *Hypogaſtrium*, it has been alſo termed the *Hypogaſtric Section*; and commonly the *Apparatus Altus*, becauſe the Operation is performed above the *Oſſa Pubis* in the ſuperior and anterior Part of the Bladder: whereas in the *Apparatus Major*, *Minor*, and the Lateral Operation the Inciſion is made beneath the *Scrotum* in the *Perinæum*. However, this new Method of Lithotomy was hardly ever once performed by its Inventor, but it was as quickly expunged the Practice of Surgery, and hardly ever mentioned in the Schools, but with a View to explode it. For, notwithſtanding its firſt Author performed the Operation with Succeſs upon a Lad of two Years old, at *Lauſanne* in *Switzerland*, Ann. 1560, it was becauſe he was obliged to it from the Stone being as big as a Hen's Egg, too large to be extracted at the *Perinæum* [a]. And though he undertook the Operation by the Intreaty of the Parents, and happened to ſucceed therein, he thinks the Succeſs ought to be attributed rather to Accident than Art: he is alſo ſo far from recommending this Method of Lithotomy, either to the Patient or Surgeon, that he pronounces it to be extremely dangerous to the Patient, and a raſh Undertaking in the Surgeon. And this was inſiſted upon the more at that Time of Day, becauſe a Wound in the upper or membranous Part of the Bladder had been always judged by the Ancients, after HIPPOCRATES [b], to be mortal. But from that Time there have been ſeveral of the more prudent Phyſicians and Surgeons [c], who were led to think, from the anatomical Structure of the Parts, joined with Examples of Succeſs in Practice, that the Method of cutting for the Stone above the *Oſſa Pubis*, might be both ſafe, eaſy, and expeditious to one acquainted with the true Situation of the Bladder without-ſide the *Peritonæum*, together with its Conformation and Connexion to the adjacent Parts, as alſo with the Method of cutting into the

[a] See his Book entitled, *Traité des Hernies*, Cap. 33. p. m. 139, 140.

[b] Aphor. 18. Sect. VI. and CELSUS *Lib.* VII. *Cap.* 26.

[c] As ROSSETUS de partu Cæſar. *Cap.* VII. HILDANUS, Lib. de Lithot. in Operib. p. m. 732, & ſeq. NIC. PIETREUS in Quæſt. Med. An extrahendum calculum diſſecanda ad pubem Veſicæ. Edit. *Pariſ.* 1635. TOLET, Treatiſe of Lithotomy, *Chap.* 13. SOLINGEN, Operat. Chirurg. PROBY in Philoſ. Tranſact. Ann. 1700. & Act. Erud. Lipſ. An. 1701. pag. 230. DIONIS Chirurgical. Operat. Demonſtrat. III. on Lithotomy. GREENFIELD on the Stone and Gravel, *Lond.* 1710. *pag.* 152. GARENGEOT Chirurg. Operat. Edit. I. Tom. I. *pag.* 358. PATIN apud Barth. Cent. IV. Epiſt. 20, 21. An. 1660.

Bladder

Bladder without injuring its Fundus. That it was poſſible for the high Operation to be performed with Succeſs, might appear from the Inſtance of its accidental Author, PETER FRANCUS, who firſt led the Way to it, as we before obſerved, without any bad Event. TOLET alſo informs us (*Chap.* 13.) that BONNETUS, a celebrated Surgeon and Lithotomiſt formerly at *Paris*, uſed to perform the high Operation there to good Purpoſe. The Method of performing Lithotomy by the *Apparatus Altus* deſcribed by TOLET, almoſt in the Manner it is propoſed by FRANCUS, take as follows.

By whom practiſed or approved.

II. Firſt, ſome Aſſiſtant is to introduce his two fore Fingers into the Patient's Anus, to protrude the Stone forwards, and towards the upper Part of the Bladder, and to hold it there: in the mean Time the Lithotomiſt makes an Inciſion ſucceſſively through the Skin, Fat, Muſcles, and Bladder itſelf, near the *Linea Alba*, a little above the *Oſſa Pubis*. Having found the Stone, after dilating the Wound with a proper Inſtrument or Dilator, he then extracts it by the Forceps; and afterwards endeavours to heal the Wound by treating it with vulnerary Balſams, according to the general Practice of treating Wounds of the Abdomen. But as for filling the Bladder firſt with Water, or ſome other proper Liquor, TOLET takes no Notice thereof, notwithſtanding it had been long before propoſed by ROSSETUS. To FRANCUS and BONNETUS we ought to add GREENFIELD as a Practitioner of the *Apparatus Altus*; for in his Treatiſe on the Stone (*Pag.* 152.) he relates that he was obliged to extract a Stone in this Method, by making an Inciſion above the *Oſſa Pubis*, which happily ſucceeded: but what was the Reaſon that obliged him to this Practice, he does not inform us, though it might be probably becauſe the Stone could not be extracted at the *Perinæum*. And though HILDANUS firſt of all diſſuades from this Method of cutting in general, yet he afterwards writes [a], if the Stone ſhould be of an exceeding great Size, *&c.* I ſhould then rather prefer the Method of PETER FRANCUS before the *Apparatus Major*: for if the Stone, by Reaſon of its Largeneſs, be preſſed towards the *Inguen*, (he would, or ought to ſay, the *Pubis*) I am perſuaded that it may be extracted with leſs Pain and Danger at the *Pubis*, than to force it through the Neck of the Bladder. But if a large Stone may this Way be more commodiouſly extracted, than by the *Apparatus Major*, as HILDANUS thinks and acknowledges, certainly a ſmall Stone may be extracted by Skill with much more Eaſe, and leſs Pain and Danger. The high Operation is alſo much recommended by PIETREUS: and the great *French* Anatomiſt RIOLAN (*in Anthropograph.* Cap. 28.) evidently proves the Operation to be practicable from the Situation and Structure of the Bladder, and tells us of its being performed within his Knowledge. Alſo DIONIS, one of the moſt eminent modern Chirurgical Writers in *France*, does, for the ſame Reaſons, think, that this Method may be not only practiſed with Succeſs; but when the Bladder has been previouſly filled with ſome warm Liquor, he thinks it preferable both to the *Apparatus Major* and *Minor*, if it were but brought more into Uſe: and he aſſerts that M. FAGON, at that Time firſt Phyſician to the King of *France*, was alſo of the ſame Opinion. Whence it appears, that many of the *French* have frequently wrote and con-

[a] Lib. de Lithotomia in Oper. Chirurg. p. m. 732, 733. But he there wrongly calls it *Sectio Inguinalis*; becauſe the Inciſion is not made in the *Inguen*, but in the *Hypogaſtrium*, above the *Oſſa Pubis*, whence it is alſo termed *Sectio Hypogaſtrica*.

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tended for this Method of Lithotomy. We have alſo a remarkable Example of a Stone extracted with Succeſs from a Maid by the high Operation, deſcribed in the *Philoſ. Tranſact.* of the Royal Society *Ann.* 1700. *pag.* 455, by one Mr. PROBY, a Surgeon: which I ſhall conſider more particularly when I come to treat of the Methods for extracting the Stone from Women. But this I am a little ſurprized at, that not one of the many *Engliſh* Lithotomiſts who have wrote on this Method, ſhould ſo much as mention this Inſtance; which one would be therefore apt to think was unknown to them, notwithſtanding it was made public in the aforeſaid *Tranſactions*, and in the two *German* Editions of my Surgery, Ann. 1724. Nor have any of the *French* Writers on this Subject taken any Notice of this remarkable Inſtance, except M. FALCONET[a], a Phyſician of *Paris*. The Caſe being thus, it ſeems to me not a little extraordinary, that ſo many eminent Surgeons and Lithotomiſts of the *French*, ſhould abſolutely reject and treat this new and more ſimple Method with Neglect, when it had been ſeveral Times performed with Succeſs[b]: nay, it even appears on many Accounts to be much more eaſy, ſimple and obnoxious to fewer Inconveniences than the other Methods. The high Operation is not attended with the Dangers of wounding the Parts ſubſervient to Generation, or for diſcharging the Urine, as the Urethra, Sphincter of the Bladder, Ureter, nor Inteſtinum Rectum. Nor are any of the larger Blood-veſſels in Danger of being this Way wounded: nor is this Method afterwards attended with a *Fiſtula in Perinæo*, an Incontinency of the Urine, or Impotency and Weakneſs from too great an Hæmorrhage. Which Advantages, with other Conveniences, are exhibited at large by ROSSETUS, in his Treatiſe *de Partu Cæſareo*; where he greatly recommends the high Operation, and demonſtrates that the Inciſion made this Way into the Bladder, if it did not communicate with the Cavity of the Abdomen, ſo as to tranſmit the Urine into the ſame, is by no means mortal.

III. In Conſideration of the fore-mentioned Advantage, joined with many weighty Reaſons, this Method of extracting the Stone, according to PETER FRANCUS, above the *Oſſa Pubis*, was induſtriouſly revived by the learned Phyſician, Dr. JAMES DOUGLAS, after it had been almoſt buried in Oblivion: for he partly by reaſoning from the Situation, Structure, and Connection of the Bladder, and partly from the Authorities of others who had wrote on the Subject, demonſtrated, before the Royal Society, *Anno* 1718, that the Stone may be ſafely extracted by cutting into the upper and anterior Part of the Body of the Bladder, when the Inciſion is ſkilfully performed. Accordingly in the Year following, 1719, his Brother, JOHN DOUGLAS the Surgeon, performed the Operation on a Man afflicted with the Stone; after which he publiſhed in the Year following, 1720, a Treatiſe on the Subject, intituled *Lithotomia Douglaſiana*. In this Treatiſe he not only confirms the Reaſonableneſs of the Method by Arguments taken chiefly from Anatomy, but alſo relates the ſeveral

Revived by DOUGLAS.

[a] In Quæſtione Medico-Chirurgica, An educendo calculo, ceteris anteferendus ſit apparatus Lateralis? Edita Pariſiis *Ann.* 1730. *pag.* 6.

[b] GARENGEOT relates, in his Chapter of high Operation, that one of the beſt *Paris* Lithotomiſts, M. THIBAUT, would never perform this Method on a living Subject, though he was acquainted with the Advantage of it. But the Queſtion might be alſo put to himſelf, why he never performed the ſame?

Advantages

Advantages of this new Method of Lithotomy, beyond thoſe commonly practiſed: and, what is more, confirms the whole by a remarkable Inſtance of his performing the Operation ſucceſsfully upon a Lad of ſixteen Years of Age; with this Method of Cutting for and extracting the Stone [a]. Soon after this, the high Operation was frequently practiſed with Succeſs, by Douglas, Cheselden, and other Surgeons of the *Engliſh*, as I had Intelligence from ſome of my Friends then dwelling at *London*, and was ſoon after informed by the Treatiſes publiſhed on the Subject. The chief of which were Mr. W. Cheselden's *Treatiſe on the high Operation for the Stone*, Lond. 1703, 8*vo*. *Cyſtotomia Hypogaſtrica*, Anonymus, Lond. 1727. 4*to*. *An Eſſay on Lithotomy by Dr.* Middleton, 4*to*. Lond. 1727. *Traité de la Taille au haut Appareil, de M.* Morand, Paris 1728. and Douglas's *Diſſertation on the High Operation*, Lond. 1729. In which he reckons up ſixty ſeveral Patients that had been cut in this Method by different Hands, the greateſt Part of them ſurviving.

When, and with what Succeſs I myſelf performed this Operation.

IV. For my own Part, as this new Method of Lithotomy appeared to be ſupported by anatomical Reaſons, profeſſed with ſufficient Weight and Evidence by Rossetus, Dionis, and Douglas; and finding it anſwer to Experiments often made by myſelf on dead Subjects, and by Douglas, Cheselden, and other *Engliſh* Surgeons, upon living Subjects; this prevailed with me in a Caſe of Neceſſity to follow the Example of Francus and Greenfield in the Year 1723, *April* 17. at which Time I performed the High Operation without any Fear, upon a Man upwards of thirty Years of Age, at *Helmſtadt*. For, in this Caſe, I could not extract a large Piece of the Stone by the Wound *in Perinæo*, according to the Method of Raw, (which was ſometimes uſed by me, perhaps before any body beſides its Author;) as the Fragment of the Stone could not be laid hold of, and conſequently not extracted by the Forceps, becauſe it lay concealed in ſome Sinus or Cavity in the Bladder, ſuch as are ſometimes obſerved by Lithotomiſts. See *Tab.* XXXII. *Fig.* 1. and 2. This I did in the Preſence of many Surgeons and Students in Phyſic, the Day after I had performed the other Method of Lithotomy without Succeſs. Nor did I in this Caſe make any previous Diſtenſion of the Bladder by injecting ſome Liquor; for that was prevented by the Wound already made *in Perinæo:* but making an Inciſion into the Body of the Bladder at the *Ductus Roſſeti & Douglaſſii* above the *Oſſa Pubis*, I then enlarged it both upward and downward by the crooked Scalpel armed with a Button at the Point (*Tab.* V. *Fig.* 5.) and introducing my Fingers, I extracted the Stone with great Eaſe and Expedition [b]. The miſerable Patient thus willingly endured the Operation, being rather deſirous to ſuffer Death, than to be perpetually tortured with the excruciating Pains

[a] The Celebrated Phyſician Dr. Martin Lister affirms, in his Journey to *Paris*, publiſhed at *London* in 1699. p. m. 238. that he formerly made Propoſals to the Royal Society for eſtabliſhing this Method of Lithotomy; but as he does not refer to the particular Part of the Tranſanctions, I could never find the Paſſage: however, ſhould the Method be at any Time reſtored to Practice, it muſt certainly reflect an Honour to his Name.

[b] Rossetus, Douglas, Cheselden, Middleton, Morand, Le Dran, Garengeot, and others, direct the Bladder to be filled with ſome Liquor previous to the High Operation; but Francus, Greenfield, Rosset, Berrier, and this Inſtance of my own, demonſtrate, that the Operation may be ſucceſsfully performed without that Preparation.

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of the Stone for the future. The Patient continued very well for the first three or four Days after the Operation. But about the fifth or sixth Day he was taken with a cold Fit, followed by a feverish Heat; which being mitigated by the Use of proper Medicines, he was yet strangely afflicted with Pains in his Back and Loins, attended with Sickness at his Stomach and Faintness, which he had been also troubled with oftentimes before the Operation was performed. The Wound, both externally and internally, was not attended with any Pain: yet the Lips could not at all be brought to suppurate and unite [a], notwithstanding I applied very good sticking Plasters, and the broad uniting Bandage, (*Tab.* V. *Fig* 8.) to keep them together, as is usual in other Wounds of the Abdomen. I also dressed with a very good vulnerary Balsam, with long and thick Compresses applied on each Side of the Wound, which however did not prevent the Urine from escaping thereby out of the Bladder: tho', at the same Time, little or no Urine passed through the Wound *in Perinæo*, and none at all thro' the natural Passage of the Urethra. In about four Weeks Time, the Patient being exhausted by great Weakness, Reachings, *&c*, died [b]. Upon opening his Body, the Wound of his Bladder made *in Perinæo* appeared to divide Part of its Neck and Body: and the Wound made above for the high Operation, appeared right in all respects, without any Opening into the Abdomen, or Division of the Peritonæum; nor was there any Blood or Urine found in the least within the Cavity of the Abdomen. But the Kidneys were found greatly ulcerated, and wonderfully distended with a purulent Matter; which was the true Cause of the intense Pain in his Back and Loins, with the other Symptoms, and was apparently the Cause of his Death.

V. But, to speak my Mind freely, this first Specimen of my performing the high Operation, tho' it was done dextrously, and according to Art; yet it did not seem to turn out so advantageously as one would have imagined from the Representations of Rossetus and Douglas, especially with regard to the healing of the Wound: which, in my Opinion, will but difficultly succeed in this new Method, and that for several good Reasons. For as Anatomy demonstrates, that the lower Part or Neck of the Bladder, is armed with a strong Sphincter Muscle for its Contraction; and as the Urine does not naturally flow out of the Bladder and Urethra by its own Weight, without the Assistance of the contractive Force of the muscular Coat, termed *detrusor*; we need not at all

The first Difficulty attending this Method.

[a] It is also an Observation made by Douglas, and the other *English* Surgeons, that when the Wound could not be suppurated and cleansed, it was impossible to recover the Patient.

[b] M. Winslow writes in a Letter upon the High Operation to M. Morand, dated *Paris* 1728, that the *Apparatus Altus* was first restored in *England* by Douglas, but in *France* by M. Morand, who first performed the Operation at *Paris* in 1727. But as I performed this Operation before M. Morand in 1723, I might possibly be the first both among the *French* and *Germans*, who undertook and described the High Operation; for I had given a full Account of the whole in the second *German* Edition of my Surgery in the Year 1724; as I also had to Winslow himself, in a Letter dated *May* 14, 1723, from *Helmstadt*: which makes me wonder, that none of the *French* or *English*, who have since wrote on the Operation, should not take any Notice thereof, except Mr. John Douglas, in his Treatise on the *High Operation*, pag. 126 and 128, published *Anno* 1729, when at the same Time my Surgery was well known in most Parts of *Holland* and *Germany*, and had a Character given of it by Sermesius, a Physician at *Amsterdam*, in his *Dutch* Translation of Douglas's Lithotomy.

wonder that the Bladder, irritated by its urinous Contents, ſhould contract and expel that Excrement with more Eaſe thro' the divided Part of the Bladder above, which has no Muſcle for its Contraction, than thro' the natural Paſſage of the Neck of the Bladder, which is always contracted by a ſtrong Sphincter: ſo that from this continual Protruſion of the Urine thro' the Wound, its Agglutination muſt be greatly impeded. To this we may add, that the external Wound in the Abdomen is alſo no leſs difficult to heal or unite: becauſe the divided Lips are conſtantly drawn from each other, by the Contraction of the oblique and tranſverſe abdominal Muſcles, whereby they conſtantly recede from the *Linea Alba* towards the *Oſſa Ilei*.

A ſecond Difficulty.

VI. Nor is the Agglutination of the Wound rendered difficult from the continual Diſtraction of its Lips barely; but alſo from the Dreſſings, and topical Application of the Medicines, being immediately ſpoiled, or rendered inefficacious, by the conſtant Efflux of the Urine. For tho' I took all poſſible Care of the Patient, which I cut by this Method, to renew the Dreſſings, and approximate the Lips of the Wound two or three Times every Day; treating the ſame with an exceeding good vulnerary Balſam, and long ſticking Plaſters almoſt ſufficient to cover the whole Abdomen, brought very cloſe to each other, together with long and thick Compreſſes applied on each Side of the Wound, and ſecured by means of a very long and ſtrong uniting Bandage, yet all proved to no Purpoſe: for the Plaſters, Compreſſes, and Bandage were all wetted and looſened by the Urine in a very ſhort Time after their Application, ſo that it was often neceſſary to repeat the Dreſſings many Times in a Day; but in the mean Time the Agglutination of the Wound did not in the leaſt ſucceed. But leſt any body ſhould think that we neglected any thing that might be uſeful or neceſſary towards the Agglutination of the Wound, it may be here proper to obſerve, that no-body has yet propoſed a better Courſe than that which was followed by us. For even Douglas and Greenfield do not ſo much as mention a Word about the Means of healing the Wound throughout their whole Treatiſes; but only tell us in general, that they cured their Patient in the ſpace of four Weeks.

Healing of the Wound often extremely difficult.

VII. From what has been now ſaid, I think it plainly appears how much thoſe are miſtaken, who prefer this Method of Lithotomy beyond the reſt, on account that the Wound this Way made, is more eaſily and expeditiouſly to be healed. For, ſay they, the Urine will, from the Laws of Fluids, much more eaſily paſs thro' the Aperture in the lower Part of the Bladder than that above; and therefore the Fiſtula, which is ſo frequently cauſed by the conſtant Flux of Urine through the Wound *in Perinæo*, will not be ſo likely to happen in the Wound made by the high Operation. But any judicious Perſon may perceive, that there is nothing at all in this, if he conſiders what we have but now ſaid of it. For as the Urine is expelled out of the Bladder, not by its own Weight, but by the proper Contraction of that membranous Receptacle, aſſiſted with the Preſſure of the Diaphragm and abdominal Muſcles; it muſt neceſſarily follow, that it will more eaſily diſcharge itſelf by that Preſſure thro' a Wound in the upper Part of the Bladder, where there is leſs Reſiſtance, than thro' the Neck of the Bladder, which is contracted with a ſtrong Sphincter Muſcle. And this ſeems in my Opinion to be the Reaſon, why ſo many Surgeons have neglected

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this new Method of Lithotomy; that though it has, in ſome Hands, ſeveral Times ſucceeded well, yet it is now laid aſide by almoſt univerſal Conſent. But the Reaſon why all the Surgeons, who have deſcribed the high Operation, have taken little or no Notice of the great Difficulty there is in healing the Wound, and ſay nothing of their Method of treating, may proceed from a Jealouſy of their Reputation; thinking it better to ſay nothing of the Matter, than to give the World an Opportunity of attributing their want of Succeſs to a want of Skill. For there are but very few Phyſicians, who, after the Manner of Hippocrates, or of myſelf, are free and open in declaring the Caſes in which they miſcarried, as well as thoſe in which they ſucceeded, in order to ſerve their Poſterity, in leaving them prudent Cautions. The Generality indeed plead, with ſome Reaſon, that the imprudent and envious may from thence find Matter for Calumny and Diſgrace, by attributing the Death of a Patient to a wrong Treatment, when his Diſorder was in itſelf incurable. Tolet tells us, from the Relation of others, that Bonnetus performed the high Operation for the Stone on ſeveral Patients: but with what Succeſs, or with what Artifices the remaining Wound was afterwards healed, neither Tolet nor Bonnetus ſay a Word. But this we are aſſured of, that Bonnetus, and the major Part of the *French* Surgeons, have ever ſince neglected this Method, and cut their Patients in the common Method by the *Apparatus Major*; which they continue to this Day, as we learn both from Hiſtory and Report. We may therefore reaſonably pronounce, that the high Operation was very ſeldom performed by Bonnetus, and perhaps never but when he could not treat the Patient, or extract the Stone by the common Appartus [a]. I might ſeem detractory to the Character of an eminent Surgeon to confeſs, that a Wound, which had appeared before to be ſlight in the Judgment of others, could yet be not at all, or but very difficultly cured by him. But we may reaſonably conjecture, that neither Bonnetus, nor any other of the moſt celebrated *French* Surgeons, had any Reaſon to reject this new Method of Lithotomy, beſides that of the ill Condition of the Wound, indiſpoſing it to heal; ſince they allowed it to have the ſeveral Advantages (mentioned § I.) over the other Methods. Some will perhaps reply, that Douglas happily cured the Wound after he had performed the high Operation on a ſtout young Man, who had no large Stone: but we are not from hence to conclude univerſally, in different Habits and Circumſtances. For there is the ſame Neceſſity for performing this Operation on Patients advanced in Years, and of an ill Habit of Body, in which the Wound will not at all be diſpoſed to heal. I muſt therefore declare my Opinion, that I think it the Part of a prudent Surgeon, not to engage in the high Operation as the beſt Method of Lithotomy, 'till more ſpeedy and effectual Means ſhall have been diſcovered for conſolidating the Wound, and approved or confirmed by repeated Inſtances of Succeſs. As far M. Tolet's Opinion, that the Wound made in the high

[a] And that difficult Caſes of this Kind may ſometimes happen, in which the moſt expert Surgeon cannot extract the Stone through the Wound *in Perinæo*, is apparent, not only from the Examples of Francus and Greenfield, but alſo by the Acknowledgment of many of our moſt celebrated modern Surgeons, V. Ruyschii *Obſ.* 89. *Vitæ Clar.* Borrichii *in Coll. Script. Chem. Illuſtr.* Sermesius *in Lib. de Lithotomia.* Douglas in his Preface, Denys *Obſerv. Chirurg.* p. 69, 71, 90, 92. and Colot *Lib. de Lithotomia in Præf.* p. 43.

Operation might be as eaſily cured as other Wounds of the Abdomen, that ſeems to be a ſufficient Proof of his being unexperienced in this Affair, ſpeaking merely by Conjecture. Laſtly, whether *Gaſtrorraphia* may be practiſed with Succeſs in this Operation, as it is recommended by ROSSETUS and SOLINGEN, I am yet doubtful; ſince the Puncturation of the Bladder in that Operation eaſily excites bad Symptoms, and as ſeveral prudent Surgeons have made Trial thereof to no good Purpoſe.

Eſpecially hazardous in bad Habits of Body.

VIII. Hitherto I have been giving you my Opinion of the high Operation, which I entertained of it in the Year 1724, when I publiſhed the ſecond Edition of my Chirurgical Inſtitutions in the *German* Language. It therefore now remains for me to give a further Explanation of the Opinion, which I at preſent entertain concerning it. After having conſidered the ſeveral neceſſary Circumſtances, with regard to the Nature and Performance of the Operation, delivered by DOUGLAS, CHESELDEN, THORNHIL, SMITH, PYE, MACGILL, MORAND, myſelf, and others; I readily concluded, from the many Inſtances of Patients happily cured by them, that the great Difficulty of healing the Wound, proceeded not ſo much from the Operation, or the Seat of the Wound itſelf, as from a depraved Habit in the Patient, who is at the ſame Time afflicted with other Diſorders. For otherwiſe the Wound appears to be not ſo difficult to heal in young Subjects, eſpecially Children, provided a proper Bandage be made uſe of, and the Wound treated firſt with ſome digeſtive Ointment, and then with a proper vulnerary Balſam, ſuch as *Linimentum Arcei*, *Balſ. Capiv.* &c. reſtraining the Patient in the mean Time to a proper Regimen and Diet. And this I can now affirm the more boldly, as there are at this Day a great many Patients happily ſurviving the Operation performed by DOUGLAS, CHESELDEN, myſelf, and others; and a more particular Account of ſome of the laſt Patients I treated, recovered by this Method, may be ſeen in a Diſſertation which I publiſhed on the high Operation in the Year 1728. So that upon the whole, we cannot but think the Performance of this Method of Lithotomy upon Boys and young Men, who are otherwiſe of a good Habit of Body, muſt be attended with Succeſs; as none ſuch have died under my Hands, or thoſe of the forementioned eminent Surgeons. We muſt therefore recommend cutting for the Stone by the *Apparatus Altus* to be in many Caſes a laudable Practice[a]; as particularly when the Stone is lodged ſo high in the Bladder, or is ſo rough, large, and ſharp-pointed, that its Extraction by the Wound *in Perinæo* is thereby rendered impracticable. However, I ſhould rather prefer the *Apparatus Minor*, as more certain and ſafe in young Children and Infants, who are apt to cry violently, which renders it hardly poſſible to fill their Bladder with ſome proper Liquor: an Inſtance of which is deſcribed by MORAND, in his Treatiſe on the High Operation, *pag.* 249 and 250.

[a] The ſame is alſo ſaid of this Method by LE DRAN in *pag.* 105. of his Treatiſe inſcribed *Parallele*, &c. as alſo by GARENGEOT, who ſays (*in Chirurg.* tom. II. pag. 274) it is in many Caſes (*une Operation excellente*) an excellent Practice, provided the Surgeon carefully obſerves the Limits of the Peritonæum, with regard to the Bladder. Of this the Reader may be well ſatisfied, by peruſing the many Inſtances alledged by DOUGLAS, in his Treatiſe on the High Operation, eſpecially in the Appendix, *pag.* 85 and 91.

IX. I am

IX. I am ſenſible, that the Examples are not wanting of Patients, who have died ſooner or later in the Courſe of this Operation: but then there are alſo more than a few, who are taken off before a Cure can be wrought by the ſeveral other Methods of Lithotomy. And that the Death of the generality, who have died after the Performance of the high Operation, has been owing rather to great Weakneſs, or a depraved Habit of Body, may appear from many Inſtances; among which many have been deſtroyed by Ulcers in the Kidneys or Bladder, as upon opening their dead Bodies has been evidently demonſtrated. But when the Patient is advanced in Years, or upwards of thirty, as they generally have been long afflicted with the Stone, and perhaps have an Ulcer in their Kidneys or Bladder, attended with other Diſorders and great Weakneſs; in ſuch I have obſerved, that the high Operation ſeldom ſucceeds well, both in my own Patients, and thoſe whoſe Caſes have been deſcribed by Douglas and Morand: where it is remarked, that ſome Patients have periſhed from the preceding Diſorders, or others from an Abſceſs formed in the cellular Membrane covering the Bladder, and others, again, from a Cancer in the Bladder itſelf. And therefore I never perform the high Operation upon full-grown Men, and thoſe advanced in Years, except there be ſome urgent Neceſſity; and particularly when the Stone cannot be extracted thro' the Perinæum. Care ſhould be therefore taken, not unjuſtly to attribute the Patient's Death to this Operation, when there is no real Cauſe. But the better to vindicate this innocent Method from ſuch falſe Aſperſions, the Surgeon ſhould never perform the high Operation on ſuch Patients as are already wore out with Weakneſs, or oppreſſed with other Diſeaſes, or are even paſſed their thirtieth Year. But for Boys and young Men, there has not one as yet miſcarried under my Care by this Operation, and very few have been loſt, even in the Hands of others, as may appear from the Writings of Douglas, &c. on the Subject; but only ſuch as have been advanced in Years, paſſed their thirtieth, and have been reduced by other Diſeaſes. Laſtly, we ought to take Notice, as Douglas has rightly obſerved, that it is a bad Preſage, and uſually a moſt certain Forerunner of Death, when the Wound can be neither duly ſuppurated nor cleanſed: but in thoſe, in whom a Suppuration happily ſucceeds, being ſuch as are young, and of healthy Conſtitution, there is hardly the leaſt room to doubt of a certain Cure.

Care ſhould be taken not to falſly attribute the Patient's Death to the Operation.

X. We have already given you our Judgment concerning the high Operation for the Stone. We ſhall now proceed to explain more accurately the Method of performing the ſame, chiefly as it has been executed in my own Practice. But before we proceed to this, it will be previouſly neceſſary, for the ſake of Beginners, to deſcribe the Diſpoſition, Situation, Connexion and Structure of the Bladder; the Knowledge of which is highly neceſſary for the ſafe Performance of Lithotomy, and particularly by this Method. And firſt therefore, upon opening the dead Body of a male Subject, the Bladder being empty, generally appears ſo ſmall and collapſed, that it lies out of View, concealed under the *Oſſa Pubis* and Inteſtines, inſomuch that hardly any Part of it can be ſeen: but upon inflating or injecting it with Water, it becomes gradually extended, till at laſt it is conſiderably expanded above the *Oſſa Pubis* towards the Navel, ſo that its largeſt and moſt ſuperior Part, termed its Body and *Fundus*, may be plainly viewed. That this Matter might be the more apparent to Beginners,

Structure and Situation of the Bladder with reſpect to this Method.

ginners, I have, in *Tab.* XXX. exhibited ſeveral Figures, taken chiefly from the celebrated M. CHESELDEN's *Engliſh* Diſſertation on the high Operation, *Anno* 1723. And here, *Fig.* 1. repreſents a dead Subject in an oblique Poſture, being a little inclined to the right, to ſhew the Abdomen chiefly; in which the common Integuments and abdominal Muſcles being laid aſide, we have a view of the Peritonæum, including the Inteſtines, and of a large Part of the Bladder marked A, which ſhews its Body and *Fundus* filled with ten Ounces of Water [a]. B is the *Urachus* by which the Bladder is connected to the Navel; CC the two umbilical Arteries; DD the *Oſſa Pubis* covered with the Integuments turned back, to ſhew that Part of the diſtended Bladder, which riſes up into the Abdomen above the *Oſſa Pubis*. *Fig.* 2. demonſtrates the Abdomen entirely open, by removing or cutting off the Peritonæum, by which means the Bladder appears to View, diſtended with twenty Ounces of Water: but here the internal Lamina of the Peritonæum marked AAAA, is left adhering to the Bladder; while its interior Lamina, or cellular Subſtance, which lies next to the Muſcles of the Abdomen, is removed. The letters BB denote that Part of the Bladder, which lies next the pyramidal and *recti* Muſcles of the Abdomen, the external or cellular Lamina of the Peritonæum being removed, in order to ſhew the muſcular Fibres. CCCCC denote the Bounds or Margin of the internal Lamina of the Peritonæum, inveſting chiefly the *Fundus* of the Bladder, which lies under and touches the Inteſtines, and is the Part of the Peritonæum, by which the Bladder is excluded from the Cavity of the Abdomen [b]. DD the *Oſſa Pubis*; EE the Inteſtines. BB denote the Part in the middle of the Body of the Bladder, which is divided in the high Operation. *Fig.* 3. repreſents only the right half of the Abdomen opened, the Inteſtines and Integuments being removed. AA ſhew the upper Part of the Bladder, properly called its *Fundus*, covered with the Peritonæum, which lies next to the Abdomen, and touches the Inteſtines. The Extremity or Bounds of which Part of the Peritonæum is limited by the Letters *aaaa*. BB is the right ſide of the Body of the Bladder itſelf greatly diſtended, being connected to the abdominal Muſcles, and does not communicate with the Cavity of the Abdomen, but is diſtinctly ſeparated from it by the Limits of the Peritonæum marked *aaaa*; ſo that if the Bladder be divided within the Bounds marked *aaaa*, the Urine cannot enter into the Cavity of the Abdomen, but runs off without ſide of the Body, and over the *Oſſa Pubis* in the high Operation, where *b b* denotes the Part of the Bladder divided in that Method, in which Place Wounds penetrating into the Bladder are not fatal. CCC the right umbilical Artery; DD the *Urachus*; E the *Os Pubis* covered with Part of the Integuments; F the broad Ligament

[a] The Method of filling the Bladder with Water, or ſome proper Liquor, for this Operation, was firſt taught by ROSSETUS, *in Lib. de Partu Cæſareo*, p. m. 263 & ſeq. Edit. Pariſ. Anno 1590. But that this is not always abſolutely neceſſary, may be concluded from Inſtances given by FRANCUS, ROSSETUS, and others, as we ſhall preſently obſerve more particularly.

[b] GARENGEOT in Tom. II. Pag. 274. of his *Surgery*, ſays, that the Bladder is (*hors du ventre*) without the Abdomen; which ſeems, in my Opinion, to be a falſe Aſſertion. The Bladder is indeed, eſpecially when collapſed, without-ſide the Peritonæum, but not without-ſide the Abdomen; becauſe it is ſituated in the *Pelvis*, which is that lower Cavity of the Abdomen formed by the *Oſſa innominata* and *ſacrum*: but this is allowed by the general Conſent of Anatomiſts, to be Part of the Abdomen. Therefore any Part ſituated in the *Pelvis* is alſo ſituated in the Abdomen.

of

of the Liver; G Part of the Liver itſelf; H Part of the right Kidney; I Part of the right *Ureter*; K K Part of the *Membrana Adipoſa*; L the left pyramidal Muſcle; M M the left *rectus* Muſcle. *Fig.* 4. is intended to repreſent the whole Abdomen opened, and chiefly the Bladder, moderately, or but little diſtended. A A A A A is the Body of the Bladder covered with the Peritonæum, the wounding of which is generally fatal. B B B denote the Part of the Bladder, which is without the Peritonæum, the Bounds of which being terminated by the Line C C C, and the Margin of the *Oſſa Pubis* D D, it takes in but a ſmall Compaſs: whence may be learned, how cautiouſly a Surgeon ought to proceed in cutting for the Stone in the high Operation, when the Bladder is but little diſtended; and in what Manner the Bladder ſhould be then carefully inciſed or divided by a narrow Scalpel. For if the Bladder be wounded in that Part of its *Fundus*, which is covered with the Peritonæum, ſo as to tranſmit the Urine into the Cavity of the Abdomen, the Wound is then mortal, or incurable: it ſhould be therefore divided only in that Part, which lays uncovered with the Peritonæum marked B B B. E E denote the Inteſtines.

Method of performing the High Operation.

XI. This neceſſary Account of the Parts being thus premiſed, without which no body ought inconſiderately to undertake the Operation, we ſhall now proceed to deſcribe the Operation itſelf. The Patient having been duly prepared beforehand for the Operation, by a proper Regimen, Diet, *&c.* [a] is to be, at the Time appointed, firſt laid in ſuch a Poſture upon the Table or Bed, that his Breech may riſe a little higher than his Head, in which Poſture his Head, Arms, Legs, and Breaſt are to be held firm by ſtrong Aſſiſtants; without truſting to Ligatures, leſt the Patient ſhould be injured by his ſtruggling: upon which Account alſo ſome prefer the Bed to a Table [b]. Under his Head ſhould be placed a Pillow, ſo that his Back may be hollow, that the abdominal Muſcles may, by that Means, be in ſome Meaſure relaxed. Then a Silver Catheter adapted by one End to a flexible leathern Tube, *Tab.* XXX. *Fig.* 5. A A, D D D, is to be gradually and ſlowly introduced into the Bladder. Inſtead of the leathern Tube may be uſed the Windpipe of an Indian Cock, according to Douglas; or the Ureter of an Ox, according to Cheselden. To which is to be faſtened the Tube C, to be afterwards fitted to a large Syringe: by which Means ſuch a Quantity of warm Water, Milk, or Barley Water is to be gently thrown into the Bladder, as the Patient can well bear, without giving him Pain or Uneaſineſs, or rather till the Bladder appears full and ſufficiently diſtended [c]. This being rightly performed, the Catheter is then drawn out of the Bladder; and the Penis with the Urethra is in the mean Time compreſſed by an Aſſiſtant, or it may be tied with a broad Tape. Then ſtanding on the right Side of the

[a] Of what great Conſequence this kind of Preparation may be to the Patient, has been ſhewn both from Reaſon and Experience by Dr. Middleton in his Treatiſe on this Method.

[b] Cheselden in his Treatiſe on the High Operation, *p.* 6. Morand and Winslow *in Lib. de Alto Apparatu*, pag. 232. and 331. and particularly Rossetus, *p.* 270.

[c] Some Surgeons, and particularly Garengeot, direct the Bladder to be filled till it can be perceived diſtended above the *Oſſa Pubis*. But I have experienced that this can hardly be perceived in dead Subjects, nor even in the living, becauſe of the Pain and ſtrong Contraction of the Muſcles: to which we may add, that Cheselden gives an Inſtance of the Bladder being broke by injecting too much Water. And the Diſtention of the Bladder by blowing in Wind with a Pair of Bellows, as Solingen adviſes, is rejected by Rossetus as both uſeleſs and pernicious.

Patient, my Method is to direct a prudent Assistant to insert his Index and middle Finger into the Patient's Anus, in order to elevate the Stone and Bladder, or press them against the *Ossa Pubis:* in the mean time I make an Incision with a small Scalpel, *Tab.* XII. *Fig.* 14. first thro' the Skin and Fat, and then by Degrees thro' the abdominal Muscles in the right Line, immediately above the *Ossa Pubis*, a little on one Side of the Bottom of the *Linea alba*, or even in the *Linea alba* itself [a], (see *Tab.* XXX. *Fig. bb* or *Fig.* 4 BC.) The external Wound ought to be about three Fingers breadth long in Children; but in Adults it may be four Fingers, or a Hand's-breadth. Then inserting the Fingers of either Hand into the Wound, particularly the left Index, I thereby feel the Bladder distended with Liquor immediately above the Margin of the *Ossa Pubis*; at their *Symphysis*; which is yet not easily to be discerned, when the Bladder is not much distended, the Muscles being rigid, or convulsed, and the Bladder itself perhaps harder than usual. I then make an Incision with the same Scalpel, or with a falciform one, having a sharp Point, in the Body of the Bladder immediately above the *Symphysis* of the *Ossa Pubis*; or else, as I once practised with Success, I make an Aperture in the Bladder with the triangular Needle or Bodkin called *Trocar* [b], without the Cannula, *Tab.* XXIV. *Fig.* 2. But this should be done very cautiously when the Bladder is very little, or not at all distended, for fear of wounding the *Fundus* of the Bladder. Then inserting the Fore finger of my left Hand into the Perforation, I therewith gently remove the Peritonæum backward from the *Ossa Pubis*, upon which it lies almost incumbent; and this to avoid injuring the Peritonæum, or the *Fundus* of the Bladder. I then pass a small Incision knife obliquely behind the *Ossa Pubis*, not into the *Fundus*, but the Body of the Bladder towards its Neck, in such a Manner that I make the Incision only with the Point thereof. This done, Part of the injected Water, Liquor, or Urine retained in the Bladder, immediately flows through the Wound. A slender Incision-knife is used to perforate the Bladder here, because a broad one might easily wound its *Fundus*, and render the Operation fatal. Through the Perforation or small Wound, I then pass a crooked or straight Scalpel, but armed with a Button at its Point, and by elevating the Knife, enlarge the Wound for the Breadth of one or two Fingers, according to the Size of the Patient: and in this Method it is not easy to wound the Peritonæum, or Fundus of the Bladder, but the opening is made in its Body only about its middle, and towards the Neck, *Tab.* XXX. *Fig.* 2. BB. But the Peritonæum marked AAA, *Fig.* 2, 3, and 4 is left intire without the least Puncture. There are some Surgeons, who advise the Incision to be made from the upper Part of the Bladder a little below the *Urachus*, and to be continued from thence to the

[a] Some Surgeons, and particularly Garengeot, say, that it is dangerous to make the Incision in the *Linea alba*, which should be therefore cautiously avoided. But this appears to be a vain Caution, both from Experience, by which myself and many of the most eminent Lithotomists have found, that the Incision will heal, as well in this Part, as in the muscular, as also from the Authority of M. Winslow, who pronounces it to be an useless Caution. Vid. Morandi *lib. de alta Operatione*, pag. 92, 209, 235, 336, 350.

[b] This Method is not described by any that I know of.

Os

Os Pubis at one Section [a]. At the same time they condemn this Method of mine as dangerous, tho' I took it from Rosset and Douglas: and they also say, that all or most of the Danger in the Operation, consists in making this Incision [b]; which I readily grant them. But as we can hardly ever be certain how far the Bladder is distended, and whereabouts that Place is under the *Urachus*, which they would have divided, I must needs think the Method here proposed by me to be the safest; especially when the Incision is made slowly and cautiously with a blunt-pointed Scalpel, or one that is armed with a Button, tho' that is also rejected by some of them. By this means I never wounded the Peritonæum, tho' I have justly performed the Operation in several Cases, where the Bladder hath had little or no Distention: whereas, on the contrary, those who make their Incision from above downward, generally wound the Peritonæum [c], which is attended with grievous Symptoms, and the Death of the Patient, notwithstanding they had taken care to distend the Bladder well by injecting some Liquor. But my Method of dividing the Bladder succeeds as well in those Cases where it is distended with Liquor, as when it has little or nothing in its Cavity; and is therefore preferable in all Cases: whereas their Method is not well practicable, but when the Bladder has been distended to a great Degree. Hence my Method has been preferred to theirs by Thibaut, a late celebrated Lithotomist at *Paris*, as Winslow and Morand [d] inform us. When I have just perforated the Bladder sufficient to admit my Finger by the Side of the Scalpel, I generally introduce my left Fore-finger, and bending it in Form of a Hook towards its *Fundus*, I gently draw that Part and the Peritonæum upwards toward the Navel, and then enlarge the Wound downward with the Scalpel, by directing it towards the *Ossa Pubis* and Neck of the Bladder; whereby the opening is generally made sufficiently large. In the mean time I also introduce the Fore-finger of my other Hand into the Bladder, and therewith examine the Size and Situation of the Stone; or whether, if it be large, there will be any Occasion to dilate the Wound still more. When these have been considered, if I find it necessary to further dilate the Wound, leaving my Finger still in the Bladder, I elevate the same a little, and enlarge the Wound either upward, or downward, or both, as far as may be safely without wounding its *Fundus*, 'till I think it sufficient for the Extraction of the Stone [e]. But if the Stone be small, and the Incision already sufficiently large, I then lay aside the Knife, and desire the Assistant, who has his two Fore-fingers inserted in the Patient's Anus, to press the Bladder and Calculus forwards as much as possible: during which I endeavour to extract the Stone by my Fingers, when it is small; and when they are insufficient, or the Stone large, I introduce the Hook, *Tab.* XXVII. *Fig.* 10. or the Stone Forceps, according as it may be more or less conveniently taken hold of by either [f]. In some Patients, who were fearful of having Water

[a] See Cheselden on the High Operation, Middleton *pag.* 17, 18. Morand Tr. *de Alto Apparatu*, pag. 33. 94.

[b] Middleton loc. cit. *pag.* 20. Morand, p. 100.

[c] Vid. Middleton, *pag.* 35, 36. and Morand *pag.* 131, 134.

[d] Morand *lib. de alt. Op.* pag. 333.

[e] Some would insinuate, that it is neither practicable nor safe thus to enlarge the Wound after the first Incision: but it may be securely performed with the obtuse pointed Scalpel.

[f] M. Denys reckons it one of the Defects of this Operation, that the Stone may be sometimes extracted by the Fingers; which in my Opinion ought to be esteemed one of its greatest Advantages.

or any other Liquor injected into their Bladder, I have ordered a large Quantity of Tea to be drank, keeping a Stricture upon the Urethra in the mean Time, by the Yoke or Inſtrument repreſented in *Tab.* XXVI. *Fig.* 9. that by this means the Bladder may be naturally diſtended: and I have thus commodiouſly inciſed the Bladder, and extracted the Stone, notwithſtanding ſome deny it to be poſſible[a]. In Patients where the Stone cannot be extracted thro' the Peritonæum, which Caſe has twice occurred to myſelf; and where the Bladder can neither be diſtended by injecting Water, nor retaining the Urine by Reaſon of the Wound made, which has happened alſo to GREENFIELD, and I believe FRANCUS; in that Caſe, having carefully divided the Skin and Fat, betwixt the *recti* Muſcles of the Abdomen, I then cautiouſly inſert the Fore-finger of my left Hand between the *Os Pubis* and Membrane of the Peritonæum (for which conſult *Tab.* XXX. *Fig.* 4. and COWPER's *Anat.* or BIDLOW's *Tab.* 41. BB.) and thereby thruſt it back from the *Oſſa Pubis*, that I may have room to make firſt a ſmall Inciſion, and then a larger, in the Body of the Bladder; and thereby extract the Stone, without injuring the Peritonæum, or *Fundus* of the Bladder. This Method of performing the Operation without diſtending the Bladder, is not taken notice of by any that I know of, who have writ on the high Operation, notwithſtanding it may be very uſeful, and even neceſſary in ſome Caſes; and that therefore diſtending the Bladder by injecting ſome Liquor, is not ſo neceſſary to the Operation as many have imagined. Tho' it muſt be owned, that more Caution and Diligence is required in this Way, than when the Bladder is filled with ſome Liquor.

Whether the Fundus of the Bladder may be divided.

XII. Some Surgeons tell us, that the *Fundus* of the Bladder is to be divided in this Operation, and that the Stone is to be extracted that Way: among which Authors GARENGEOT is the principal in both Editions of his Chirurgical Operations. But this is a bad and even dangerous Advice, being a falſe and erroneous Aſſertion ariſing from a wrong or imperfect Knowledge of the Bladder and its Parts. We may alſo obſerve, that GARENGEOT in his *Splanchnologia*, treating on the Bladder, does not ſay one Word of its Parts, and the Manner of dividing it; tho' it be of the laſt Importance to Beginners in Chirurgical Operations and Wounds where the Bladder is concerned, and more eſpecially with regard to the ſeveral Methods of Lithotomy. Others divide the Bladder wrongly into two Parts only, its Neck and *Fundus*, omitting its Body: and theſe, in deſcribing the high Operation, tell us, that the *Fundus* of the Bladder is the Part to be inciſed; which, as we have before obſerved, is by the general Conſent of the moſt prudent Phyſicians, allowed to be mortal: becauſe the Urine has then a Paſſage into the Cavity of the Abdomen, and, by its Putrefaction

[a] This Method of filling the Bladder has been propoſed by ROSSETUS *pag.* 269 and 275, and particularly by plentiful drinking Spaw-waters, or ſome other diuretic Liquor: but I do not know that any, either of the *French* or *Engliſh*, have followed his Advice, and taken up the Practice. Yet that it may ſucceed, will appear not only from Caſes of my own, but alſo from a remarkable one of PROBISCHIUS, who cured a Lad of twelve Years old by this Method, notwithſtanding he wounded the Peritonæum to ſuch a degree, that the Inteſtines prolapſed, as he tells us in a *German* Tract *de Operatione Alta, Anno* 1727. But WINSLOW adviſes for the Patient to uſe himſelf to retain his Urine for a conſiderable Time after drinking plenty of Tea, and, for ſeveral Days before the Operation, to cauſe a gradual Expanſion of the Bladder, MORAND *p.* 310.

and

and Acrimony, deſtroys the Patient. If we would therefore conſider the Parts of the Bladder diſtinctly, we ought to divide it into its Neck, Body, and *Fundus*, as I did many Years ago in my *Anatomical Compendium*, conſidering it as a Pitcher or Jug, to which RIOLAN[a] and other Anatomiſts have very aptly compared it; in which Veſſel there is the Neck, the capacious Body of it, and the Bottom, upon which it ſtands. But it would appear abſurd to any one to call the Body of the Pitcher, which follows its Neck, the Bottom of it, ſince by the Bottom of it is commonly underſtood the lowermoſt Part of the Pitcher oppoſed to its Neck and Mouth: and ſo in the Bladder, which repreſents a Pitcher or Stone-bottle inverted, we may reaſon in the ſame manner. See *Tab.* XXIX. *Fig.* 8. or *Tab.* XXXII. *Fig.* 1, 2. Therefore (in *Tab.* XXIX. *Fig.* 8.) the Letters AA denote the Neck of the Bladder; BB the Body, or Bladder itſelf; and C its Fundus, tho' that Part is in our erect Poſture uppermoſt: D the proſtate Gland; EE Part of the ſeminal Veſicles in a Lad or Boy under twelve Years of Age. Otherwiſe as the Bladder is commonly conſidered out of the Body, that Part by which the Butcher inflates it is termed the Neck, the Part oppoſite to this, its *Fundus* or Bottom, and the Part intercepted betwixt theſe two is juſtly called the Body, or Bladder itſelf; which is the Part to be divided in the high Operation, and not the *Fundus*, which has been rightly obſerved by ROSSETUS above an hundred Years ago[b]. As in cutting for the Stone by the *Apparatus Minor* of CELSUS, and by the Lateral Operation, the Body of the Bladder is divided in the inferior lateral Part of its Face, which by ſome is not improperly called its Baſis. *Tab.* XXIX. *Fig.* 1. So in the high Operation the Body of the Bladder is divided in the middle and lower Part of its Face, as in *Tab.* XXIX. *Fig.* 8. *litt.* BB. and *Tab.* XXX. *Fig.* 2. BB. But in no Method is the *Fundus* of the Bladder divided. For whenever the *Fundus* of the Bladder, *Tab.* XXX. *Fig.* 2, 3, and 4. AAA, or that Part of it next the Inteſtines, which is covered with the internal Lamina of the Peritonæum, is divided or perforated, ſo that the Urine may paſs thro' the Wound into the Abdomen; in that Caſe the Wound certainly proves fatal, as we obſerved before. Therefore no Regard is to be had to thoſe who raſhly tell us, that the *Fundus* of the Bladder ſhould be divided in the high Operation; even tho' they aſcribe their Opinion to ROSSETUS, who never entertained any ſuch Thoughts, but only directs the Body of the Bladder to be inciſed betwixt its Neck and *Fundus*, where it is not covered with the Peritonæum, as is before demonſtrated. The great Anatomiſt RIOLAN has diſcourſed ſo diſtinctly concerning the Neck, Body, and *Fundus* of the Bladder, that it ſeems ſurprizing to me, that the Generality of the modern *French* Surgeons ſhould have altogther neglected the Diſtinction, (which in my Opinion is of the higheſt moment) and inconſiderately declare as a matter of no Conſequence, that the *Fundus* of the Bladder is to be divided. Moſt of the *Engliſh* Surgeons, on the contrary, are of the Opinion with myſelf and ROSSET, that the Body only of the Bladder ſhould be inciſed; as may appear by one Inſtance among many, taken from the Words of MIDDLETON, tranſlated into *French* by MORAND, when he ſays: "If the Inciſion in the Body of the Blad-

[a] Anthropographia, *Cap.* XXII. *de Veſica.*

[b] Lib. *de partu Cæſareo*, p. m. 261, 271, 272. edit. Pariſ. Anno 1590.

" der is ſufficiently large," *(quand l'inciſion dans le corps de la veſſie eſt ſuffiſament étendue) &c.*

What is to be done after the Operation.

XIII. The Stone being extracted according to the Directions I gave at N° X. the next thing to be done by the Lithotomiſt is to paſs his Fingers into the Bladder, to ſearch if any thing yet remains there which ought to be extracted: which may be better done in this way of cutting than any other. If nothing can be found, the Wound being covered with a Linen Cloth, or Compreſs, the Patient is to be then laid upon the Bed, and the Wound dreſſed with ſome dry Lint laid upon the Cloth, which is to keep it from ſlipping into the Bladder: and the whole is to be retained by a Compreſs, and a large Napkin folded together, and applied round the Abdomen, in the ſame Manner as is uſual in other Wounds of that Part. Within a few Hours after the Operation, the Wound is to be again dreſſed with ſcraped Lint ſpread with ſome digeſtive Ointment, and retained with an Emplaſter; over which ſhould be applied a thick Compreſs wetted in *Aq. Calc. cum Spir. Vin. Camph. Lap. Medicamentoſ. & Sal. ammoniac. admixt.* or in warm Wine, in which hath been boiled ſome diſcutient Herbs: which being applied round the largeſt Part of the Abdomen, ſhould be frequently renewed, and retained by a Napkin faſtened tight round the Body. This Proceſs ſhould be continued often for the firſt four or five Days after the Operation, to prevent any violent Inflammation. Thus with Care and diligent Attendance the Wound will come to Suppuration, and be perfectly cleanſed within the Space of ſeven, eight, or more Days in young Men and Boys, and ſometimes even in old Men of a healthy Conſtitution: and then the Wound is to be dreſſed once or twice in a Day with *Lin. Arcæi*, or *Balſ. Capiv.* &c. and the Lips of the Wound ſhould be brought and retained together by ſticking Plaſters judiciouſly applied, as in the dry Suture. But a more early Application of theſe Plaſters I take to be not only uſeleſs, but pernicious inaſmuch as they prevent or retard the cleanſing of the Wound. Over the Plaſters it will be proper to apply an uniting Bandage, or the Napkin in Uſe before may be now faſtened a little tighter round the Abdomen: and thus things ſhould be continued till the Bladder and Lips of the Wound are united, and the Urine entirely diſcharges itſelf by the natural Paſſages. And this Agglutination of the Wound ſucceeds ſometimes in three or four Weeks, and ſometimes longer, more or leſs according to the Patient's Age, Habit, and other Circumſtances.

What is to be obſerved farther.

XIV. When the Patient is ſo well recovered as to be able to riſe out of Bed, ſit up, and walk about, I do not deny them in thoſe reſpects ſome refreſhment when they have a ſtrong Deſire for it: nor do I rigidly confine them to lie always on one Side or on their Backs, as ſome do, to the great Uneaſineſs of the Patient, and without any viſible Advantage. Among thoſe whom I have cured by this Operation, I remember a Lad of thirteen Years old, who, being fatigued with long lying in Bed, left his bed without my Leave on the ſeventh Day after the Operation, and continued to ſit up, and walk about for ſome time, without any apparent ill Conſequence, the Agglutination of the Wound in the mean time ſucceeding very well: and he was perfectly cured in the fourth Week. In ſome Patients the natural Paſſage of the Urethra is obſtructed with a ſandy and mucous Subſtance, ſo that the Urine cannot make its Exit

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that Way: in which Caſe the beſt Method is to lay the Patient on one Side, and inject warm Water through the Urethra into the Bladder, by which Means the offending Matter may be expelled through the Wound. Or inſtead of injecting Water, a Blow-pipe may be inſerted into the Urethra, and the Matter thereby inflated into the Bladder, to be afterwards diſcharged at the Wound: by either of which Methods the Urine generally paſſes afterwards in its former Courſe by the Urethra. This Artifice was firſt practiſed by RUNGIUS, an eminent Surgeon at *Breme*, after he had ſeen me perform the ſame Operation with Succeſs in the ſame City. If the Calculus ſhould be broke in the Attempt to extract it, it may be then taken out with the Fingers, and extracted in pieces: or if that cannot well be performed, ROSSETUS has contrived a convenient Inſtrument in the Form of a narrow Spoon, incurvated in a particular Manner, as he repreſents (*pag.* 280.) whereby the Stone and Sand, if there be any, may be eaſily drawn out. To facilitate and promote the Agglutination of the Wound, ROSSETUS adviſes the conſtant Retention of a Catheter in the Urethra, that the Urine may always meet with a free Paſſage to flow out of the Bladder, without paſſing through and offending the Wound. In Imitation of which M. MORAND has contrived a ſhort Catheter, from whence he promiſes to himſelf great Advantages. See his Treatiſe on the High Operation, *p.* 240, and 254. where a leaden Probe was introduced, which had been before recommended by LE DRAN, *pag.* 341.

XV. Leſt any body ſhould think, that this Method of cutting for the Stone was contrived without any manner of Neceſſity, we ſhall briefly conſider the chief Advantages thereof, and enumerate the Particulars, wherein it ſeems to excel the foregoing Methods. And firſt, as in this Operation there is no Wound made in the Sphincter, or Neck of the Bladder, proſtate Gland, or Urethra, which are alſo neither of them in the leaſt injured by the Knife, Forceps, or other Inſtrument. There is therefore not the leaſt room to fear an Incontinency of Urine, or a Fiſtula in the Urethra and Perinæum from that Quarter: with which Diſaſters thoſe who are treated by the *Apparatus Major*, or even in the lateral Operation are uſually afflicted. 2. When the Stone is large and rough, or angular and prickly, the Neck of the Bladder and proſtate Gland are then violently contuſed, lacerated, and injured, as well in cutting by the *Apparatus Major*, as in a ſomewhat leſs Degree by the lateral Method; in conſequence of which there generally follows violent Pains, Inflammation, and incipient Mortification in the Bladder, which uſually terminate in Convulſions and Death [a]. Whereas in this Method, where the Wound is made in the anterior Part of the Body of the Bladder, immediately above the *Oſſa Pubis*, thoſe malignant Symptoms in the Neck of the Bladder and Urethra are not in the leaſt to be feared. 3. And for the ſame Reaſon too, the Parts ſubſervient to Generation, as the proſtate Gland, Muſcles of the Penis, and ſeminal Veſicles, with their excretory Duct, *&c.* are not ſubjected to receive any Injury by this Method: which Parts being wounded or hurt by the *Apparatus Major*, or in the lateral Operation, the Patient is often thereby rendered ſteril, or at leaſt not ſo capable of the conjugal offices. 4. Neither the Ureter, Rectum, nor any large Blood

The Uſes and Advantages of this Method.

[a] To prevent this, DENYS adviſes to deſiſt from the Operation if the Stone be found angular or prickly. But then the Patient continues *ſtatu quo*.

Veſſels

Veſſels are endangered in the High Operation of FRANCUS, tho' they may be eaſily wounded in the other Methods, and thereby a dangerous Hæmorrhage, and other bad Symptoms brought on: becauſe there are only a few ſmall Veſſels diſtributed in the ſuperior Part of the Bladder; and the Inteſtinum rectum, with the Ureters, are far enough off from the Wound. 5. If the Calculus appears from certain Signs to be rough and ſharp-pointed, (which we may know partly from the violent Pains and frequent Diſcharge of bloody Urine, which it occaſions, as well as from the Touch by the Finger *in Ano)* the Extraction of it is then ſcarcely practicable with Safety, either by the *Apparatus Major*, *Minor*, or by the lateral Operation, as is confirmed by Reaſon, and repeated Inſtances in Practice: whereas by this Method the Extraction may be very commodiouſly performed, as there is an ample Aperture made in the Bladder, which may be ſtill further enlarged upon Occaſion, according to the Size and Nature of the Stone. 6. This Method of cutting may be performed with fewer Inſtruments than either the *Apparatus Major*, or the lateral Operation, and the Stone may be often this way extracted with the Fingers only: and the more ſimple Methods of operating are always preferred by the judicious to thoſe which are more complex and difficult. 7. Neither the Bladder nor Urethra are in this Method moleſted, or irritated by Catheters, which frequently occaſion Pain, Inflammation, and other bad Symptoms, as TOLET [a], and others acknowledge. 8. If the male or female Conductor be thruſt into the Bladder a little too forcibly or deeply in the *Apparatus Major*, or in the lateral Operation, it is thereby frequently wounded, if not abſolutely perforated, which laſt is mortal, as GARENGEOT [b] aſſerts: which in the *Apparatus Altus* is not in the leaſt to be feared, as thoſe Inſtruments are never uſed in that Method, there being no Occaſion for them. 9. Nor is there any Neceſſity to bind the Patient with Ligatures, to ſecure him in ſo formidable a Poſture for the high Operation, as muſt be for the *Apparatus Major*; whereby the weak Patient has been ſometimes obſerved to be almoſt killed with Fear before the Operation is begun [c]. 10. We can in no Method inſert our Fingers ſo eaſily, nor ſo far into the Bladder as in this; and therefore we cannot in the other Methods ſo well inform ourſelves concerning the Size, Figure, or Number of the Stones, with the moſt convenient Method of extracting them, and whether the Bladder is abſolutely cleared of them: all which may be more certainly and commodiouſly performed in the high Operation. M. DENYS, the great Patron of the *Ravian* Method of Lithotomy, confeſſes, that ſmall Stones cannot indeed be eaſily found in the lateral Method of RAW: but that, ſays he, is a Defect in common to all the Methods. But the *Apparatus Altus* cannot be ſaid to labour under the ſame Defect; for in that Method even ſmall Stones may be eaſily found, as we often know by Experience, and as he himſelf acknowledges ſoon after, in *pag.* 117. When the Stone is ſo ſmall, that it cannot be found, nor taken hold of in the lateral Method, the ſame Author *(pag.* 130.) adviſes the Lithotomiſt to relinquiſh the Operation; whereas

[a] Lib. de Lithotom. *Cap.* XIII.

[b] Tom. I. Edit. 1. Cap. de Lithotom. *pag.* 352. An Example of this kind may be alſo ſeen in SAVIARD, *Obſ.* 37.

[c] Vid. WINSLOW's Epiſt. in MORAND. lib. de *Alto Apparatu*, pag. 331.

he might readily extract it by the *Apparatus Altus*. Nor are we as yet furniſhed with any Inſtance, in which a ſmall Stone could not be extracted by the high Operation, ſo as to fruſtrate the Proceedings of the Operator: The *Apparatus Altus* is therefore much preferable on this account to the lateral Method of Lithotomy. 11. If the Stone ſhould adhere or grow to the Bladder (which tho' denied by ROSSET, DOUGLAS, and others, is yet confirmed by the Experience of MIDDLETON and THORNHILL [a], a remarkable Inſtance of which, among many others, has occurred to my own Obſervation, a Deſcription of which may be ſeen in my Diſſertation *de Alto Apparatu*, pag. 43.) it may very often in that Caſe be ſeparated by the Fingers in this Method [b]. But, if it appears too large to be extracted, we do not hereby torture the Patient to Death, as is often done in the other Methods of Lithotomy; but being perfectly convinced of the Caſe, we judiciouſly deſiſt in Time. 12. The Stone is not eaſily to be broke in this Method of extracting it, as in the *Apparatus Major* is frequently done; becauſe in this Method the Extraction is not made thro' ſo narrow an Aperture, the Wound being of itſelf ſufficiently large, and ſtill capable of a further Extenſion, as the Bladder is more dilatable in its Body than towards its Neck. And if the Stone ſhould be broke in this Method, from its being of too ſoft a Texture, the Fragments of it may be more eaſily and certainly extracted, either by the Fingers, Scoops, or other proper Inſtruments, than in any other Method of Lithotomy, even with the Conſent of the moſt eminent of the *French* and *Engliſh* Surgeons. 13. Stones of a longitudinal Figure, ſituated in a tranſverſe Poſition in the Bladder, are of all Stones the moſt difficult to extract, and not without great Pain and Danger, if at all in the common Method of Lithotomy: whereas in the *Apparatus Altus* there is no ſuch Difficulty or Danger, as it may be more ſecurely taken hold of in its leaſt Diameter. 14. If the Stone cannot be found or extracted in the *Apparatus Major*, or in the lateral Operation, from its being concealed in ſome Fold or Cavity of the Bladder, ſuch as hath been obſerved by RIOLAN [c], or from any other Cauſe; or if the grooved Catheter cannot be paſſed into the Bladder, becauſe of ſome Inflammation, or Tumor in its Neck, or at the proſtate Gland, or from the exquiſite Pain, Hardneſs, a Tubercle, or Stone in the Urethra, or Neck of the Bladder [d], or from a Phimoſis, or intenſe Stricture of the Prepuce; or if the Patient utterly abhors, or is averſe to the Catheter, Inſtances of which have been known by myſelf and others: in all theſe Caſes the *Apparatus Altus* is the only Method of relieving the Patient, as hath been experienced by FRANCUS, GREENFIELD, myſelf, and perhaps others, and at leaſt the like Accidents may happen hereafter. And therefore upon theſe and other Accounts the high Operation is preferred to the *Apparatus Major* by CHESELDEN, MORAND, GARENGEOT, and others. 15. But one of the chief Advantages of this Method of cutting, which is eſteemed

[a] Vid. MORAND. Tr. de *Alt. Apparat.* pag. 152. and MIDDLETON pag. 44.

[b] Vid. Lithotom. DOUGLAS Edit. II. pag. 65.

[c] Anthropograph. *Cap.* XXIII.

[d] An Example of the high Operation being happily performed in a Caſe where the Catheter could not be paſſed into the Bladder from a Stone obſtructing its Neck, may be ſeen related in COLOT. *in Lib. de Lithot.* pag. 45. notwithſtanding he was a profeſſed Enemy to that Method. See SAVIARD Obſ. *pag.* 203.

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ſo by Rosset and Pietreus, is, that it may be more eaſily performed than any other Method of Lithotomy: inſomuch that any young Beginner [a] in Surgery may undertake it with a little Judgment; becauſe the Inciſion is here to be made of no great Depth, but right down thro' the Integuments and Muſcles of the Abdomen into the Cavity of the Bladder. But this is true only, when it has been previouſly filled and diſtended with ſome convenient Liquor, without being obliged to obſerve any particular Meanders or Incurvations of the Urethra. But when, for various Reaſons, the Bladder cannot be thus previouſly filled and diſtended, then indeed it cannot be eſteemed ſo eaſy an Operation, but muſt be attended with ſome Danger from the Smallneſs of the Space in which the Inciſion is to be made into the Bladder betwixt the *Oſſa Pubis* and *Peritonæum*, whereby a ſmall Slip or Exceſs in the Inciſion may divide the *Fundus* of the Bladder, and occaſion a mortal Wound; eſpecially if one ſhould make their Inciſion from above downwards, *i. e.* from the *Fundus* of the Bladder or *Urachus* towards the *Oſſa Pubis*, according to the precarious Directions given by ſome Lithotomiſts: for in that Caſe it may be juſtly reputed a difficult Operation, requiring the Hand of one well verſed in Anatomy and Surgery. It is in Conſideration of this Danger that all prudent Surgeons, who have treated on the Operation from Rosset down to the preſent Day, have adviſed a previous Diſtenſion of the Bladder with ſome Liquor, as a thing highly, if not abſolutely, neceſſary to cure the Patient. And for the ſame Reaſon the eminent Lithotomiſt Tolet prudently adviſes thoſe, who intend to cut for the Stone by the high Operation, firſt to perform the ſame frequently upon dead Subjects, and eſpecially (which is worth obſerving) when the Urine is firſt diſcharged; leſt he ſhould be incapable of rightly performing the Operation in difficult Caſes, where the Bladder cannot be diſtended without endangering the Patient's Life.

Objections againſt this Method.

XVI. Before we cloſe this Chapter it may not be amiſs to obviate a few of the chief Objections, which may ſeem to be ſtarted with Plauſibility by ſome of our modern Surgeons and Lithomiſts againſt the high Operation; which we ſhall do, not out of Love for cavilling, but only from a Deſire of illuſtrating the Truth, and of improving the important Operation of Lithotomy. M. Denys, Surgeon and Lithotomiſt at *Leyden*, who was formerly Aſſiſtant to M. Raw, when alive, and ſucceeded him in Lithotomy upon his Deceaſe, being at preſent a ſtrenuous Defender of his Method, tells us [b], that the high Operation is in many Caſes impracticable upon many accounts, and that thoſe Patients, who cannot be freed from the Stone, by that Method, might yet be cured by the lateral Operation of Raw. But I ſhould have deſired that Gentleman firſt to have demonſtrated, or ſpecified ſome of thoſe many Caſes wherein he aſſerts the high Operation to be impracticable; and then to have proved it by

First Objection, that it is often impracticable.

[a] As it was performed by ſeveral at *Paris*, according to the Relation of M. Winslow in Morand. *Lib. de Lithot.* pag. 329.

[b] *In Obſ Chirurg. de Calculo & Lithotomia*, An. 1731. in Pref. *p.* 4. In which Preface he aſſerts, that he publiſhed the Book to favour the World with what Obſervations he had made in the Practice of the lateral Operation of Raw; and the ſame thing he repeats again in the Beginning of his Treatiſe, *page* 2. But all this he ſays without doing it; for he does not ſo much as give us a full Deſcription of the *Ravian* Method, as he had promiſed, and I expected; but he only endeavours to prove throughout the whole Book, the Method he wrote of was the beſt, that Raw invented it, and that he himſelf ſucceſsfully performed it.

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inſtancing an Example in Practice, in which the Stone could not be extracted by the high Operation, and was afterwards affected notwithſtanding by the lateral Method of RAW. For my own Part I can find no ſuch Example: but, on the contrary, I have before obſerved, that I extracted the Stone from two Patients by the high Operation, when I could not effect the ſame *in Perinæo* by the lateral Method, notwithſtanding I might ſafely affirm myſelf perfectly verſed in the Practice of it. M. DENYS indeed tells us of a Caſe, in which RAW could not extract the Stone by the high Operation. (*pag.* 69 and 71.) and of another (*p.* 91, 92.) that happened to the eminent Lithotomiſt of *Amſterdam*, BORTELIUS: by which laſt I have often ſeen this very Method performed with great Parade and Dexterity. The laſt mentioned Lithotomiſt indeed grants, that the high Operation may be ſucceſsfully performed upon ſome, eſpecially young Children, (and therefore he does not diſapprove of it;) but that it cannot well be performed upon all. But even among theſe I muſt again ſay, that I never yet met with an Inſtance where the high Operation was performed, and the Patient could not be freed from the Stone thereby, though it has in ſome Caſes been very large, (See *Tab.* XXXII. *Fig.* 6.) and therefore ſuch Inſtances ought to have been produced. Whereas, on the contrary, there are many Caſes in which the Stone could not be extracted by the other Methods of Lithotomy.

XVII. The Second Objection raiſed by the ſame Author againſt the high Operation is, that it takes up a longer Time in the Performance than the lateral Method, (in *Pref.* pag. 5, and 99.) But if we except the previous Diſtenſion of the Bladder, by filling it with ſome Liquor, the Inciſion itſelf, and Extraction of the Stone, may be performed in as ſhort a Time as in the *Apparatus Major*, and lateral Operation, if nothing extraordinary ſhould hinder: and it is apparent to every one, that the filling of the Bladder is not the Operation, but only one of the preparatory Requiſites in the *Apparatus*. We alſo obſerve, that, in the lateral Operation and the *Apparatus Major*, Obſtacles frequently occur, which greatly impede and prolong the Operation; even as M. DENYS himſelf has confeſſed, by relating ſome Obſervations on this Head, particularly (*pag* 57.) that M. RAW was one Time three Quarters of an Hour in ſearching after, and extracting the Stone. In ſhort, I may boldly aſſert, that the high Operation may in many Caſes be ſooner performed than the lateral Method: as when the Stone cannot be readily found by reaſon of its Smallneſs, or when it lies concealed in ſome Sulcus or Cavity [a] of the Bladder on either Side, or behind the *Oſſa Pubis*. Whereas in the high Operation it may be no leſs expeditiouſly found, than extracted, as there is in that Method Room enough to ſearch into every Part of the Bladder with the Fingers, which are of all Inſtruments the beſt Searchers and Extractors; eſpecially if an Aſſiſtant, by introducing his Fingers into the Patient's Anus, preſſes forwards the Bladder and Stone towards the Aperture. But tho' the Stone may be thus readily extracted by the Fingers, ſometimes aſſiſted with the Forceps or a Hook, in the high Operation, as DOUGLAS, CHESELDEN, and MORAND acknowledge; yet in the lateral Method and *Apparatus Major*,

Second Objection, that it is longer in performing than the lateral Method.

[a] *Foveæ*, or Cavities in the Bladder capable of intercepting the Stone, may be ſeen in *Tab.* XXXII. *Fig.* 1 and 2, as I once found them in a dead Subject; an Obſervation of the ſame kind hath been given us by RIOLAN and others.

the Surgeon is often a long Time ſearching with the Forceps for the Stone in the dark, and often ſtill longer in extracting it. Beſides, to ſay nothing at preſent of what DOUGLAS, CHESELDEN, MORAND, and others, have obſerved on this Head, I have often performed this Operation expeditiouſly enough, even where the Stones were large and jagged.

Third, that it is more painful.

XVIII. The third Objection ſtarted by M. DENYS is, that the high Operation for the Stone is more painful than the lateral Method [a]. But this does not appear to be true, nor could I ever obſerve that there is any thing in it. But, on the contrary, I have often known Children to make but little Clamour from the Pain of this Method, in Compariſon with what they often make in the lateral Operation, and upon other Occaſions. This indeed muſt be confeſſed, that when the Stone is very large, and alſo rough, it then gives the Patient moſt excruciating Pain. But then this is an Inconvenience that attends all the Methods, but the high Operation leſs than the reſt, as may appear from the large Stone thus extracted, which is repreſented at *Fig.* 1 and 2, of our Diſſertation *de Alto Apparatu*; in the Extraction of which the Patient ſeemed to have little or no Pain, in Compariſon of what they frequently ſuffer in Lithotomy.

Fourth, that it cannot be performed on ſmall Bladders.

XIX. Laſtly, M. DENYS objects, that the high Operation cannot be performed on all Subjects, and eſpecially Infants and Children, becauſe of the Smallneſs of their Bladders. But the Operation is ſo far from being difficultly performed on thoſe Subjects, that when it is executed by a judicious Hand, it generally ſucceeds the beſt. Inſtances of which may be ſeen in DOUGLAS, CHESELDEN, MORAND, MIDDLETON, and others, upon Boys of only three or four Years old [b]. But, what ſeems a little more reaſonable, he objects, (*pag.* 99 to 105.) with GARENGEOT, and ſome others [c], that it is neceſſary, in the high Operation, to diſtend the Bladder ſo much with Water, that it may aſcend a good Way above the *Oſſa Pubis*, which cannot be done where the Bladder is ſmall and thick; and that therefore this Method cannot ſucceed in all Patients. The high Operation may indeed be more expeditiouſly and ſecurely performed when the Bladder is previouſly well diſtended with ſome Liquor: but I have before taken notice, that if the Bladder cannot be conveniently in this manner diſtended, as it is not abſolutely neceſſary, the Operation may be performed with Caution, when it is but moderately diſtended, or even when it is wholly collapſed. Therefore this Preparation ought not to be eſteemed as an Incumbrance to the Operation, it being only a Precaution for the more ſafe Performance of it. For you may obſerve, that there was none of this Diſtenſion of the Bladder made in any of the Caſes, where the Stone could not be extracted by the Wound firſt made *in Perinæo* by FRANCUS and ROSSET, and yet we find that the Stone was happily this Way taken from the collapſed Bladder, without either wounding its *Fundus*, or the Peritonæum. Thus alſo the Operation has been ſucceſsfully performed by PROBISCHIUS [d] and myſelf, barely by cauſing the Urine to be retained, by making a ſlight Stricture on the Urethra, after

[a] Loc. cit. *pag.* 99.

[b] Vid. COLOT in *Præf.* pag. 37. where he tells us he has cut Children of eighteen Months old by this Method.

[c] Operat. Chirurg. *pag.* 280. T. II.

[d] See my Diſſert. *de Alto Apparatu*, pag. 53.

plen-

plentiful drinking of Tea, and without injecting any Liquor by the Urethra[a]: not to mention the Instances recited by BERRIER, MORAND, and others, in which the Bladder has been rightly incised, and the Stone happily extracted, when the Bladder could not be thus distended with any Liquor, through the Clamours of the Children, who were not above four Years old.

Other Objections to this Method.

XX. Moreover, M. DENYS objects, that after the Bladder has been filled, the Penis is obliged to be strongly compressed either by the Fingers, or a Ligature, to prevent the Reflux of the Water before the Bladder is incised; by which Means will be brought on a Tumor, Inflammation, and other bad Symptoms. But I must declare, that no such bad Symptoms have ever appeared under my Observation: nor can I imagine how they should, since a very slight or gentle Compressure will be sufficient to restrain the Liquor in the Bladder; which may be commodiously performed, as we before observed, by the Steel-Instrument, *Tab.* XXVI. *Fig.* 9. termed a Yoke, designed for an Incontinency of Urine. An Instrument of the like Kind has been also recommended by M. WINSLOW for the same Purpose, which is delineated in NUCKE's *Chirurgical Operations*, *Fig.* 11. and may be seen in our Surgery, *Tab.* XXVI. *Fig.* 10. The next Objection is, that the Patient, treated by the high Operation, is obliged to lie constantly on his Back. But this is not true: for they may often turn themselves, and lie on their Sides or Belly, if they have a mind. Which last is sometimes recommended by DOUGLAS, WINSLOW, MORAND, and others, especially after the Parts have been suppurated, in order to promote the Agglutination of the Lips of the Wound. In the last Place he objects, that Sand and Fragments of the Stone cannot be so well extracted in this, as by the lateral Operation. But what is much more advantageous, there need not, in this Method, be any Fragments broke off from the Stone, since the Incision is made very large, and the Stone generally extracted with no great Violence by the Fingers only: insomuch, that I judge it to be one of the principal Advantages of the high Operation, as I have before demonstrated, that the Bladder may be thereby more perfectly cleansed from calculous Fragments and small Stones, if such there should be, than by any other Method of Lithotomy. For that such Fragments and small Calculi are very difficultly extracted by the *Apparatus Major* and lateral Operation, is even acknowledged by M. DENYS himself: whereas in the high Operation, when the Bladder is elevated by an Assistant, the Stone may be very readily found and extracted, either by the Fingers or convenient Instruments; which cannot be so readily done in any other Method as in this, by the universal Consent and Declaration of all Lithotomists, who have treated on the Subject. In *pag.* 118. M. DENYS asserts, that the Patients treated by the high Operation are afterwards troubled with an Incontinency of Urine: which is absolutely repugnant to the Experience both of myself and others. In short, all the Advantages which this Author attributes to the lateral Method of RAW in *pag.* 119. may be also justly asserted of the high Operation. And M. LE DRAN confesses, that large Stones may be more securely this Way extracted,

[a] This Method of distending the Bladder by retaining the Urine, has been much recommended by M. WINSLOW in *Morandi Lib. de Alt. Ap.* p. 319. more especially if the Patient had used himself to retain his Urine a long Time for several Days before.

than by the *Apparatus Major:* before which Method the high Operation is alſo preferred by Mr. CHESELDEN on ſeveral Accounts.

In what Caſes this Method is leſs convenient.

XXI. But leſt any body ſhould think, that I only approve of and practiſe the high Operation, and deſpiſe all the other Methods of Lithotomy; I ſhall conclude this Chapter by enumerating briefly the Caſes in which it is leſs convenient than the other Methods. And, firſt, it appears from the Experience of myſelf and others, that this Method of Lithotomy is not ſucceſsful in old Men, or even ſuch as have paſſed their thirtieth Year; as ſuch ſeldom recover according to MIDDLETON, DOUGLAS, and others, to mention no more than M. SMITH, *pag.* 91. whoſe Words, in this Reſpect, are very remarkable: *viz.* that *all above thirty or forty Years old, who have undergone this Operation, have died, except one.* And I myſelf have cut four, whoſe Age has exceeded thoſe Years, but none of them recovered. The high Operation is alſo ſeldom attended with Succeſs, when the Patient is previouſly afflicted with ſome other Diſeaſe, eſpecially thoſe who have an Ulcer in their Kidneys or Bladder, are reduced by a Conſumption, or have a ſcirrhous Bladder; in all which Caſes the Methods of cutting *in Perinæo* are allowed to be preferable to the high Operation by all the Lithotomiſts who have treated on the Subject: becauſe by the lower Methods the Bladder may be more eaſily cleanſed and conſolidated. The ſame is confirmed by daily Experience, which ought always to be regarded as the beſt Maſter. Laſtly, the high Operation is more difficultly performed than the other Methods upon ſuch Subjects as have ſmall Bladders; which may be known partly from their containing but a ſmall Quantity of Urine, and partly from the Difficulty of moving the Catheter in the Bladder: in theſe Circumſtances I ſhould therefore adviſe one, who is not expert in performing this Operation while the Bladder is flaccid, without injuring its *Fundus*, or the Peritonæum, to chuſe ſome other Method. However, the Operation is not impracticable in all ſmall Bladders, as ſome would have us believe. See N°. XVI. of this Chapter. From hence it is ſufficiently apparent, that, according to the different Diſpoſitions of the Patient's Habit, State of his Bladder, the Stone, and other Circumſtances, a prudent Surgeon will ſometimes prefer one Method, and ſometimes another, according as it ſhall appear more or leſs convenient. But if any one is deſirous of ſeeing more concerning the high Operation, they may conſult DOUGLAS, MIDDLETON, CHESELDEN, ROSSET, MORAND, LE DRAN, and GARENGEOT, who have more largely treated of the Subject: To theſe they may alſo add my Diſſertation *de Apparatu Alto*, which was publiſhed at *Helmſtadt* in the Year 1728.

An EXPLANATION *of the* THIRTIETH PLATE.

Fig. 1, 2, and 3, are taken from Mr. CHESELDEN's Treatiſe of the high Operation, in order to ſhew the Poſition and State of the Bladder when diſtended with Liquor, preparatory to the Operation. But as theſe Figures have been explained at large in N°. IX. of this Chapter, we ſhall refer our Reader thither, to avoid troubling him with a ſecond Repetition.

Fig. 4. Repreſents the Abdomen opened, the Bladder being moderately, or but little diſtended, either by the Urine or ſome Liquor; that hereby may appear how

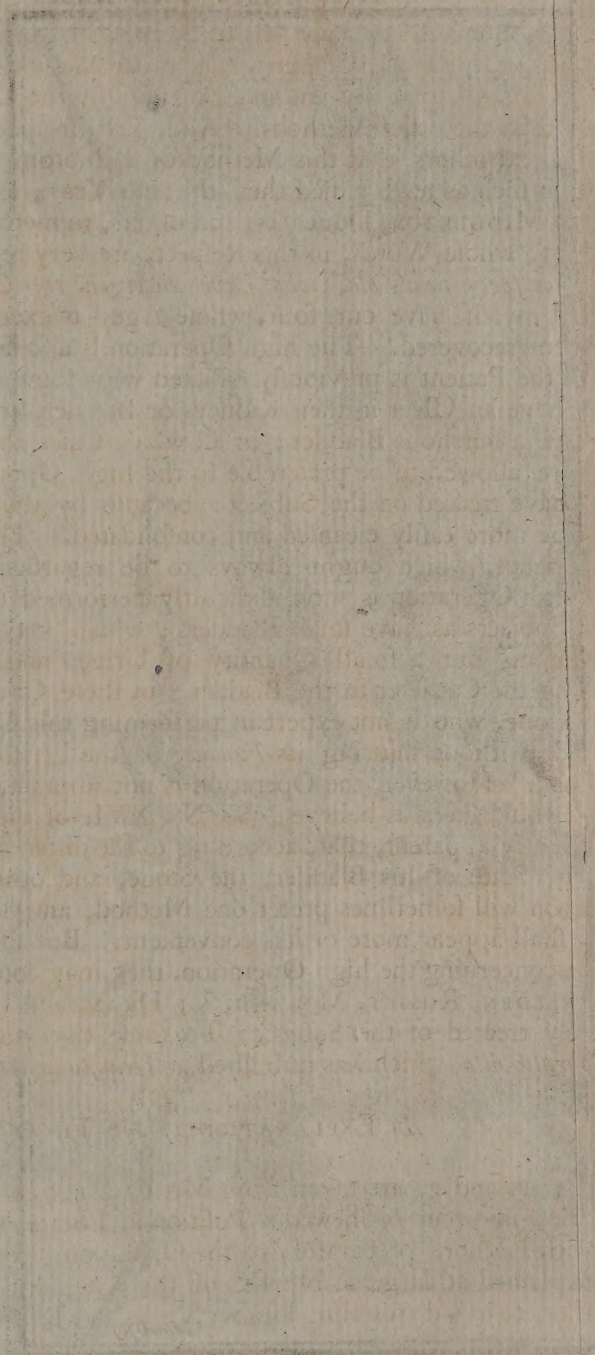

Fig. 5.

Fig. 1.

Fig. 2.

Fig. 4.

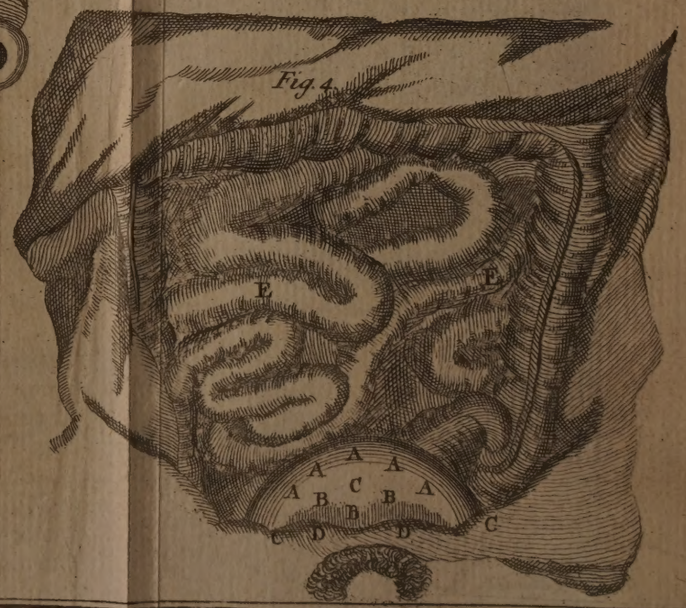

Fig. 3.

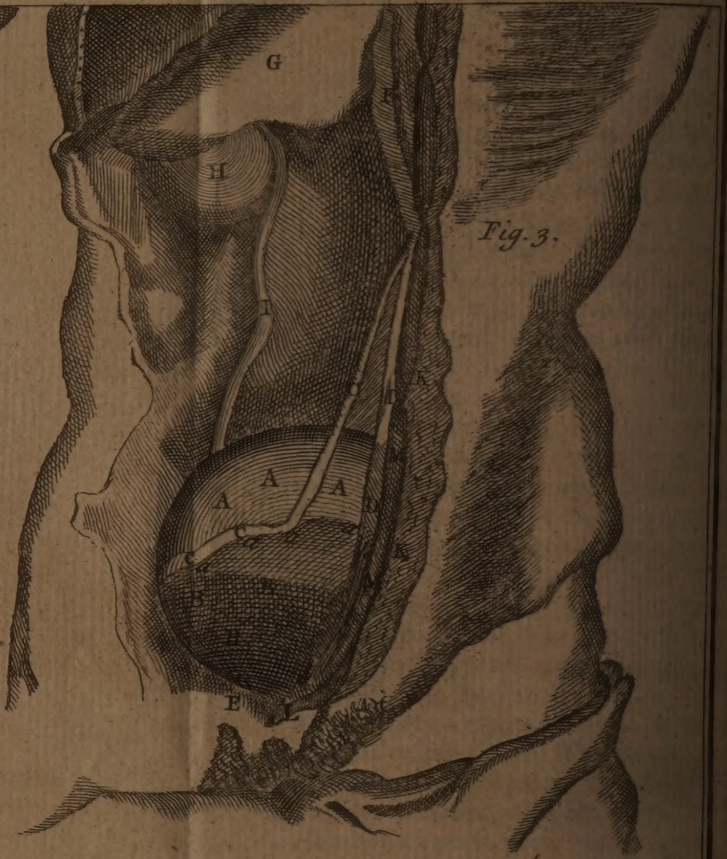

Fig. 6.

J. Mynde sc.

how ſmall a Space there is then remaining betwixt the *Oſſa Pubis* and *Fundus* of the Bladder covered with the Peritonæum, being the Part to be inciſed by the Lithotomiſt. But a more particular Explanation may be ſeen in the Place but now mentioned.

Fig. 5. Denotes the Pipe or Tube, by which the Liquor is to be conveyed into the Bladder, in order to diſtend it for the Operation; which is alſo taken from Mr. CHESELDEN. A A is a Silver Catheter, which is paſſed thro' the Urethra into the Bladder. B the Aperture in each Side by which the injected Liquor enters the Bladder. C a Braſs-pipe, which is to be adapted to a ſizable Syringe. D D D a flexible Pipe made of Leather, or an Ureter of an Ox, by means of which the inflexible Tube and Catheter are joined to each other: and thus the Injection may be more eaſily performed, than if the whole was an inflexible Tube, ſuch as was in Uſe with ROSSETUS. E the Part of the flexible Tube, which is tied with a Thread to the Catheter; where there is alſo a tranſverſe Handle, which ſerves to hold the Catheter ſteady, that it may not hurt the Patient during the Injection.

Fig. 6. Repreſents the Pouch or Caſe for holding the ſeveral Inſtruments for Lithotomiſts, diſpoſed in their proper Order. This is to be faſtened round the Lithotomiſt in the Manner repreſented at *Fig.* 9. *Tab.* XXIX. and was always uſed by RAW, as being more ready and expeditious, than to truſt to an Aſſiſtant, who may chance to be attending ſomething elſe. A A A A the Pouch itſelf; B B the Inſtruments diſpoſed in their proper Order. C C the Side or Cover to the Caſe, which may be faſtened with the Buttons marked D D, that ſo the Inſtruments may be concealed from the Patient's Sight, not to deter him. E E the Strings, by which the whole is faſtened round the Waiſt of the Lithotomiſt.

CHAP. CXLIII.

Concerning the Artifices uſed by Frier JAMES, (Frere Jaques) *in cutting for the Stone; as alſo on the* lateral Operation *of* RAW.

I. ABOUT the End of the laſt Century there was a famous *French* Lithotomiſt, named Frere JAQUES, who, at that Time, frequently performing that Operation in a peculiar Manner, was the Subject of every one's Thoughts and Diſcourſe: and even 'till this Day he has been ſo much talked of among Surgeons and Lithotomiſts, that we cannot well paſs him by in Silence, without taking Notice both of him and his Method, with the new Artifices which he introduced in Lithotomy. About the Year 1697 this Perſon, who was an obſcure Monk, or Hermit, as ſome call him, came to *Paris* from ſome of the Out-parts of [a] *France* in a very miſerable Condition, being both deſtitute of Money, Victuals, and Cloaths; but of an open and free Temper, his

A Deſcription of the Perſon and Reception of JAMES at *Paris*.

[a] Some tell us his Name was BEAULIEU of *Beſcançon* in the County of *Franche*; others ſay of *Beaufort*, a Town near *Beſcançon*.

Sim-

Simplicity of Mind, being judged commendable by ſome of the *French* Writers. Here he produced and ſhewed almoſt every body the many Teſtimonies of Patients that he had happily cut and cured by his ſafe and ready Method in the ſeveral Provinces of *France:* and tho' his Artifices were yet unknown to any of the Surgeons, he made no Secret of them. As for the Reward of his Labour, he required none, or at moſt but very little, as much as would repair his Inſtruments, pay for the mending of his Shoes, or the like. At length he addreſſes himſelf to the chief Surgeons and Phyſicians of the *French* King at *Paris*, deſiring that he might have the Liberty of cutting and curing ſuch Patients as were afflicted with the Stone in that City, and the great Hoſpitals, by his new and as yet unheard-of Method; at the ſame Time ſtrenuouſly aſſerting, that his chief Deſign, in coming to *Paris*, was to teach them a better Method of cutting for the Stone. Hereupon the Surgeons, and particularly the Lithotomiſts, were highly diſpleaſed, that JAMES ſhould put himſelf upon a Par with themſelves: but being taken with the Addreſs and Novelty of the thing, and partly out of Curioſity, they permitted him to perform the Operation firſt upon a dead Subject, that had a Stone conveyed into the Bladder.

His firſt Operation on a dead Subject.

II. The dead Subject being made ready, and many Surgeons and Phyſicians preſent, JAMES began his Operation in the following Manner: Firſt, the Body being laid and ſecured in the uſual Poſture upon the Table, he then paſſed an ordinary, or common tubulated (not the grooved) Catheter into the Bladder in the uſual Method, and therewith he extruded the Side of the Bladder in the left Part of the Perinæum. He then made an Inciſion with a Knife a little longer than the common Biſtory, near the Perinæum, but in a Manner ſomewhat different from the common Practice: for guiding the Knife upwards from the Anus, near which he had entered it, he divided the Parts nearly in a right Line, in the left Side of the Perinæum, about two Fingers Breadth from its Raphe or Suture, the Inciſion reaching obliquely up to about the Middle of the Perinæum, in which he cut through the Neck of the Bladder, and Part of the Bladder itſelf, without injuring any other Part of the Urethra. Then paſſing his Finger through the Wound into the Bladder, he ſearched for the Seat of the Stone: which done, he paſſed an Inſtrument like a Spoon through the Wound, and having thereby introduced a Pair of Stone-forceps into the Bladder, he extracted the Spoon or Conductor. And now, laying hold of the Stone with the Forceps, the Catheter being withdrawn, he extracted the ſame very dextrouſly, to the great Admiration of the Spectators, notwithſtanding the Stone was nearly as big as a common Hen's Egg.

The Judgment paſſed on his Operation.

III. The Operation being thus concluded, the Surgeons, upon inſpecting the Body, found, that this new Lithotomiſt had firſt cut thro' the common Integuments of the Perinæum to about the length of two Fingers Breadth; that the Wound next paſſed betwixt the Accelerator and Erector Muſcle of the Penis, without injuring either of them, till it had reached and penetrated the Neck of the Bladder, and Part of its Body in a right Line for about an Inch, agreeable to the Practice in the *Apparatus Minor:* and, laſtly, he had extracted the Stone through this Inciſion. The Particulars of the Caſe being duly conſidered, ſeveral of the moſt prudent Phyſicians there preſent, and particularly MERIUS, could not help thinking, that this new Method of Lithotomy

was much preferable to the Method of cutting by the *Apparatus Major*, and muſt be attended with leſs Danger. For in the common Method of cutting by the *Apparatus Major*, it is not only neceſſary to divide the Urethra; but the Neck of the Bladder and its narrow Sphincter, together with the proſtate Gland, are alſo violently dilated and contuſed: and then again, if the Stone ſhould be conſiderably large, thoſe Parts muſt be ſtill further injured by the Violence uſed for its Extraction. However, as the Majority of the moſt eminent Surgeons and Lithotomiſts were not fond of promoting new Methods introduced by inferior Hands, we need not wonder that they would not permit the new Lithotomiſt to perform his Operation on a living Patient.

James next cuts for the Stone upon a living Subject.

IV. James finding himſelf thus coldly received by the *Pariſians*, addreſſes himſelf to the King's Surgeons and Phyſicians, who then reſided with the Court at *Fontainbleau:* and to them he ſhews his Letters of Recommendation, and Teſtimonies of Patients, that he had happily cured by cutting, in the ſeveral Parts of *France*; requeſting of them that he might be permitted to perform his new Method of Lithotomy upon a certain young Man a Taylor, there afflicted with the Stone, which Requeſt was immediately granted. James performed the Operation according to the preceding Method, ſo ſucceſsfully before the King's Phyſicians and Surgeons, that, to his great Applauſe, the Patient was, in leſs than three Weeks time, ſeen walking about in the *Areas*, and troubled with none of the bad Symptoms, which uſually attended the common Method of cutting.

And hereby acquires a great Reputation.

V. This lucky Inſtance of his Succeſs brought James to be taken Notice of, and reſpected by every body, not excepting the King himſelf, and made moſt of the *Pariſians* look upon him as a Phyſician ſent from Heaven for the Relief of Mankind, by his new and better Method of Lithotomy. Therefore in the Spring following, *Anno* 1698, having obtained the King's Licence, he returned to *Paris*, and performed his Operation upon a great Number of Patients, being always attended with ſuch a Crowd of Spectators, that at laſt it became neceſſary to have a Guard of Soldiers to keep the Tumult in Order.

His Treatment of the Patients.

VI. It is to be obſerved, that James never uſed any Manner of preparing his Patients for the Operation by Bleeding, Purging, Diet, or proper Regimen, as was cuſtomary with other prudent Surgeons and Lithotomiſts. Nor did he uſe any Ligatures to ſecure the Patient, as they did in the other Methods; but the Patient being laid on a Table, with his Legs bent upward, was ſecured by the Hands of ſtrong Aſſiſtants only. In his Extraction of the Stone, he was, by the Report of Dionis and others[a], ſo intrepid or rather cruel, that it ſtruck a Horror into moſt of the Surgeons preſent, who, tho' they were Men of Courage in their Profeſſion, could not avoid being under Pain for the Patient's labouring under the Severity of his Hand. And, in like manner, he was ſo careleſs with regard to dreſſing, and binding up the Wound after the Operation, and ordering a proper Regimen, that, when the Patients deſired him to take care of them in thoſe reſpects, his anſwer was generally: "It is ſufficient that I have

[a] In his Surgery, under the Chapter of Lithotomy. And the ſame is alſo affirmed by Dr. Liſter in his Journey to *Paris*, and Saviard, Obſ. *pag.* 454.

"extracted

"extracted the Stone, God himself will cure the Wound" [a]. He treated Women, that had the Stone, in the same Manner as he did Men, without the least Difference, only he generally wounded their Vagina in cutting them; but that, says he, is a Matter of no Consequence, it is rather what should be done.

The Event of his Operations.

VII. But, in order to form a better Judgment of his whole Proceedings in Lithotomy, it will be necessary to consider what was usually the ultimate Event of his Operations, which will generally appear with no good Aspect. If we may believe Merius (who was at that Time a celebrated Surgeon in *Paris*, and wrote a laudable Dissertation upon the whole Affair in *French*, which he published at *Paris* in the Year 1700) out of sixty calculous Patients, which were cut by him in the Spring of the same Year, twenty five of them perished, only thirteen of them were cured, and the Remainder of them were left with a Fistula, or an Incontinency of Urine. And M. Dionis in his Surgery [b] writes seven Years after Merius, that, in his Time, more than half the Patients, which had been cut, and passed for being cured of the Stone by James, were since deceased of the various supervening Symptoms; and that the Method of cutting used by him was so cruel and imprudent, that it was no Wonder if every one of them had expired. And to add Authority to his Sentence, M. Dionis alledges, for Instance, the young Man, a Taylor, which, as we before mentioned, was the first that James cut for the Stone at *Fontainbleau:* and though it was thro' him that James acquired so much Reputation, yet the Patient was not only ever after troubled with a Fistula *in Perinæo*; but his Constitution and Body thereby gradually wasting and decaying, there was not two Years passed before he changed a miserable Life for a more welcome Death. Whereas the same M. Dionis assures us, that, of twenty-two Patients which were cut for the Stone in the same Spring by other Hands, there wereonly three of them lost, almost every one of the rest being perfectly restored to their former Health.

The Result of inspecting his dead Patients.

VIII. Upon opening and inspecting the dead Subjects, which had been cut for the Stone by James, it was observed by the fore-mentioned reputable Authors, that the Bladder was very often cut quite off from the Urethra; in others they found a Cancer, or an incipient Mortification of the Bladder and Intestines: and in others, the Muscles, Nerves, and Blood Vessels of the Penis had been divided by the Knife [c]. In some, the elevating Muscle of the Anus and Blood-vessels from the Hypogastrics were seen cut in sunder; in others, the Back-part of the Bladder was observed three or four Times perforated towards the Cavity of the Abdomen: and in others again, the Wound of the Bladder appeared unequally, lacerated and distorted. In some Patients he perforated the Rectum, so that the Fæces were discharged through the Wound: and in several Women which he cut, he not only wounded the Bladder, but also the *Vagina* and *Intestinum Rectum*, so that it was no wonder several of them had a Discharge of their Fæces thro' the *Vagina*. And, lastly, by his wounding

[a] *Je lui ay tiré la pierre; Dieu le guerira.*

[b] Published in the Year 1707 in 8vo at *Paris*.

[c] Many more Observations relating to this Effect may be seen made in Dr. Martin Lister's Journey to *Paris*, 8vo, *Lond.* 1699.

ſome of the adjacent large Blood-veſſels, there followed ſuch a Profuſion of Blood that the Patient ſometimes expired, either under the Knife, or ſoon after the Operation.

His other Errors.

IX. Nor did he always obſerve, to make his Inciſion in the ſame Place, when he cut for the Stone; but he would ſometimes divide the Perinæum above an Inch higher or lower than he did at others: ſo that thro' his Inconſtancy and Negligence it was almoſt impoſſible for him to avoid injuring ſome Part or other, which ought not to be touched, every Time he performed the Operation. Beſides, what is always a great Impediment to the Practice of Surgery, he was often ſo unprovided with ſuitable Inſtruments, that he has ſometimes uſed a common Razor to cut for the Stone, inſtead of the Inciſion-knife proper for a Lithotomiſt. And I myſelf have heard the *Dutch* People ſay, while I was in *Holland*, that when our Lithotomiſt came thither from *France*, he at firſt cut a great Number for the Stone; and would ſometimes uſe a common blunt Knife to perform the Operation, when his own Inciſion-knife was not at hand. If that was the Caſe, it is no Wonder, that his Patients were ſo conſtantly expoſed to the moſt malignant Symptoms, and grievous Diſorders. Alſo while he was at *Paris*, in a Lad troubled with the Stone, the Calculus fixed itſelf in the Cavity of the Urethra immediately behind the Scrotum *in Perinæo*; notwithſtanding which he obſtinately cut him according to his uſual Method, near the Anus: when it would have been much more commodious to have done it, like other prudent Surgeons, in that Part of the Perinæum, where the Stone offered itſelf. Theſe, and the like Circumſtances, inſtead of demonſtrating him to be a rational and prudent Lithotomiſt, proved that he was no more than a raſh and empirical Practiſer: which is ſtill more ſtrongly confirmed, by his being totally ignorant of every thing in Anatomy, and of every Operation in Surgery; unleſs that he would ſometimes undertake the Cure of Ruptures by the Knife, when they occurred to him. But as in that Operation he always deprived the Patient of his Teſticle, without any Neceſſity, like the Generality of Mountebanks; it is thence more than probable, that he learnt his imprudent Artifices of ſome Empirick or Quack: for he would never, that I could hear of, reveal where he learnt his Art[a].

James now begins to come into Diſgrace.

X. James having thus imprudently treated ſuch a Number of Patients with the very worſt Succeſs; and ſo conſiderable a Perſon as the Marſhal *de Loyre* being almoſt dead, the Day after he was cut, with the moſt excruciating Pains, but happily preſerved by the Aſſiſtance of M. Fagon, the chief Phyſician, and a prudent Surgeon: it naturally followed, that the Reputation of our new Li-

[a] M. Meri tells us (*in Obſ. de Methodo* Jacobi, *pag.* 43.) that he learned his Art formerly of ſome Phyſician: whom I take to have been ſome itinerant Surgeon, or Mountebank, perhaps not altogether ſo ignorant as James, who perhaps from his own Imagination, and the reading of Celsus, or Guido, contrived and practiſed this new Method of Lithotomy, together with Celotomy. This James being a Servant to him, and often aſſiſting in the Operations, was afterwards bold and raſh enough to attempt the ſame himſelf, tho' utterly ignorant of Anatomy, and every other neceſſary Qualification. An Inſtance of the like kind is ſtill within my Remembrance, of a Mountebank that, among other Places, uſed the Fairs at *Francfort* in *Germany*, who had a Servant to look after his Horſes: but, the Fellow being ſtrong, he often employed him in holding the Patients during his Performance of the Operation for Ruptures and Lithotomy. At length, thinking he had ſeen enough, he deſerted his Maſter's Service, and ſet up for an Operator, tho' perfumed with the Stables; and with Succeſs anſwerable.

thotomiſt began now to be turned into Diſgrace, inſomuch that the Generality of the *Pariſians* quickly pronounced him a very ignorant and imprudent Operator. He therefore quitted thoſe Quarters; and, after travelling over moſt Parts of *France*, he came at laſt into *Holland*, particularly to *Amſterdam* and *Leyden*: and from thence he went thro' moſt of the principal Counties and Cities in *Germany*, performing his Operation in all of them, but generally with his former ill Succeſs. But what with his Raſhneſs and Cruelty, the Unfitneſs of his Inſtruments, and wilful Negligence, he could not eſtabliſh any Reputation in thoſe Parts, eſpecially for the firſt Years: ſo that he quite loſt the Name of a wiſe and prudent Surgeon, which he at firſt acquired. However, though Matters then run into ſo bad a Condition with him, it is worth obſerving, that he ſoon after began to alter and improve in his Operation, as I have been informed in a Letter from the celebrated Phyſician and Anatomiſt SALTZMANNUS at *Straſburg*; he telling me, that JAMES had there made Emendations in his Method of Lithotomy; and that in the Year 1712, and in the Beginning of 1713, he had ſucceſsfully cut ſixteen Patients in that City, making uſe of a grooved Catheter: adding, that JAMES had ingenuouſly whiſpered him in the Ear, that he had laid aſide his former raſh Method of cutting; that he had abſtained from it above a Year; and that he now treated his Patients in a more judicious Manner. As theſe Circumſtances have been omitted by the Generality, if not by all the Writers on this Subject, they are preſumed to be known but by few: and therefore I thought it would not be amiſs to inſert them here, that nothing might be wanting to compleat the Hiſtory of our Lithotomiſt. Agreeable with what I have before related, is the Account we find of JAMES, written by M. FEHRIUS, a Phyſician of *Switzerland*, in *Page* 23 of his Diſſertation *de Calculo Veſicæ, ejuſque per ſectionem auferendi Methodo noviſſima, præſtantiſſima & facillima*, publiſhed at *Baſil*, *Anno* 1716. In which we read, that out of ſixteen, who had been lately cut by JAMES at *Straſburg*, there was only one old Man who died, and that chiefly thro' Age, which was before predicted by him. In the ſame Treatiſe, *pag.* 17 *& ſeq.* we alſo meet with a very diſtinct Account and Deſcription of the lateral Operation of RAW, long before it was publiſhed by ALBINUS, as he had often ſeen it performed by that Lithotomiſt. Pretty much the ſame Account we alſo find of Frier JAMES's Reformation and Succeſs in Lithotomy at *Straſburg*, publiſhed by SCHAFFERUS in a Diſſertation, *de variis Lithotomiæ Generibus*, pag. 24. printed at *Straſburg*, *Anno* 1724. In which he ought to have made the Time *Anno* 1712, inſtead of 1711, as SALTZMANNUS obſerves. Much to the ſame effect alſo WEISBACHIUS[a], who had lived at *Straſburg*, tells us, that of twenty Patients which he had ſeen cut by JAMES, hardly one of them miſcarried, and that each of them obtained a preſent Cure without any remaining Fiſtula. But he neither mentions the Time when, nor the Place where, he had ſeen this; tho' I ſuppoſe it was at *Straſburg*, becauſe that had been the Place of his Reſidence[b].

[a] In his *Medicina Practica, Cap. de Calculo*, written in the *German* Language, and publiſhed at *Straſburg* in the Year 1715, and ſince often reprinted.

[b] It was therefore from *Straſburg* only that I was aſſured of JAMES's Succeſs in Lithotomy. But however prudent, or rather lucky, he might be in that City, it was not ſo with him at *Francfort on*

XI. But

XI. But however imprudent or raſh might be the Practice of JAMES in his Lithotomy originally, it is certain that his Method was of this Service, that it gave other more prudent Surgeons and Phyſicians a Hint of improving their Practice this Way, and even in other Diſtempers, to the Advantage of Mankind. Thus from this Method of Lithotomy, as DIONIS rightly obſerves in the Chapter on that Subject, in his *Chirurgical Operations*, we were directed to improve and perfect the Operation of puncturing the Perinæum, to empty the Bladder in a Suppreſſion of Urine. For the Bladder itſelf might be much more ſafely and conveniently perforated by the Trocar, than its Neck, as was till then the Practice: which we ſhall conſider more particularly when we come to that Operation. And ſecondly, the Method of Lithotomy itſelf uſed by JAMES, might be performed to very good Purpoſe by a prudent Surgeon, who is well ſkilled in the Anatomy of the Parts; notwithſtanding it ſucceeded ſo badly in the ignorant and raſh Hands of that firſt Operator. But we do not find that M. DIONIS has any where declared the Manner of perfecting this Method of Lithotomy uſed by JAMES, and of avoiding his Errors.

On what account his Method was of Service.

XII. However, the celebrated Surgeon at *Paris* M. MERI made it his Buſineſs to publiſh a Treatiſe on this Method of Lithotomy, in order to perſuade Surgeons to come into the Practice of it: though, in a little while afterwards, he uſed all his Endeavours to diſſuade them from it again. But he propoſed it with this Improvement: that, inſtead of the common tubulated Catheter uſed by JAMES, the Operator ſhould cut upon a grooved Catheter, like that uſed in the *Apparatus Major*. This grooved Catheter being paſſed into the Bladder, and then held in the left Hand, he ſays, is to be next thruſt outwards againſt the left Side of the Perinæum, as was the Practice of JAMES. The Lithotomiſt muſt then proceed to cut thro' the Perinæum into the Groove of the Catheter, with a proper Inciſion-knife, or Biſtory, like what is uſed in the *Apparatus Major*, ſo as to divide the Neck of the Bladder with ſome Part of its Body which lies next to it, continuing the Inciſion cautiouſly onward, till the Aperture is big enough for the Extraction of the Stone. Through the Wound thus made, is to be introduced a hollow Conductor into the Bladder, termed by the *French* a *Gregoret*, in the ſame Manner as is uſual in the *Apparatus Major*: and, laſtly, by introducing a Pair of convenient Forceps, the Stone itſelf is to be extracted. But tho' we muſt here confeſs M. MERI to be the firſt and real Improver of JAMES's Method of Lithotomy, yet we cannot ſay, that he ever made Trial of it upon any living Subject: but rather ſoon after he had made this Emendation, he again rejected it, pronouncing it unſafe, and much inferior to the common Method by the *Apparatus Major*. However, I believe he was the primary Occaſion of this Method being performed as he had corrected it, by the celebrated M. MA-

It gave Occaſion for contriving a better Method.

the Main, in my own Country; as I was informed by an eminent Surgeon, and a Phyſician of that Place (namely GLADBACHIUS and SUTORIUS) in the Year 1713. For, during his Stay at that Place, which was from the Beginning of the Spring to September, he cut but two Patients for the Stone, tho' many for Ruptures: but a few Days after the Operation, one of the firſt died in the public Hoſpital. This made the Surgeons and Phyſicians at *Francfort* entertain but a mean Opinion of his Skill: nay they even affirm, that he was a Man at that Time perfectly ignorant in the Sciences, and of good Manners; that he could ſcarce read or write, and did not ſo much as know how to apply a proper Dreſſing and Bandage to the Wound after his Operation. But of this more hereafter.

RESCHALL, who cut by it with Succeſs at *Paris* not long after JAMES; if we may rely on what we find written in Dr. LISTER's Journey to *Paris* before-mentioned: which Paſſage, in *pag.* 239, is ſo extraordinary, that it ſeems ſurprizing to me, that it was never taken notice of by any of the *French*, or even *Engliſh* Writers on the Subject[a]. I ſhall therefore relate the Affair as I find it in the ſaid Journey of Dr. LISTER, which Account was given him after his Return from *Paris* to *London*, by another learned *Engliſhman* Mr. PROBY, who ſtill reſided at *Paris*, and ſaw JAMES cut for the Stone there in the Year 1698, *Auguſt* 2. when he ſent the Doctor the Letter now mentioned, in which we meet with the following Paſſage: "That the Surgeons of *Paris* "greatly ran down JAMES, notwithſtanding they followed his Method. For "M. MARESCHALL had, from that Time, cut for the Stone according to "JAMES's Method, with only this Difference, that he uſed a grooved, inſtead "of the common Catheter. And that M. LE RUE, another Surgeon of the "Hoſpital *La Charité* had, at the ſame Time, cut according to the old Me-"thod; but not with ſuch good Succeſs as M. MARESCHALL had practiſed "the Method of JAMES. For that all who had been cut by M. MARESCHALL "were then alive, and well: but that M. LE RUE had loſt ſeveral, and that "even thoſe who ſurvived his Method, were not ſo ſoon well as the others." But whether or no the ſame Method was continued, and often repeated by MARESCHALL, or others after him at *Paris*, we have no Accounts; at leaſt none that I hear of. It ſeems to me a little extraordinary, that none of the *French* Writers ſhould have taken any Notice of this Affair, ſince M. MARESCHALL died but a few Years ago, and ſaw the Operation that was firſt performed by MORAND and PERCHETUS at *Paris* in 1730, according to Mr. CHESELDEN's Emendations, as MORAND himſelf informs us, in *Memoir. Acad. Reg.* 1731. But M. GARENGEOT declares PERCHETUS to be the firſt that cut for the Stone by the lateral Operation after JAMES at *Paris*. See his *Operat. Chirurg. T.* II. *pag.* 230. which may be beſt judged of and decided by the *French* Surgeons.

Of the RAVIAN Method.

XIII. This new Method of Lithotomy was ſoon after corrected and revived in *Holland* by the celebrated *German* Phyſician RAVIUS, or RAW, whom I followed for ſome Time as my Preceptor in Surgery[b] and Anatomy; with whoſe Name I ſuppoſe every body, that knows any thing of the Hiſtory of Phyſic, muſt be well acquainted. For RAW had not only often ſeen JAMES

[a] Mr. DOUGLAS is the only Perſon that has taken any Notice of Dr. LISTER's Account in his Treatiſe on the *Lateral Operation*, pag. 37 and 39. But he does not thence infer, that M. MARESCHALL was the firſt who performed the Operation on a living Subject after JAMES, which follows in Conſequence of Dr. LISTER's Words, if true.

[b] For from the Spring of 1706 to October of the Year 1710 I lived in *Holland*, and ſpent moſt of that five Years time in *Amſterdam*, where I diligently attended on the Operation of RAW. This RAVIAN Method of Lithotomy was publiſhed with learned and juſt Recommendations in the Year 1725 by ALBINUS, Profeſſor of Anatomy and Surgery at *Leyden*, under the Title of *Index Supellectilis Anatomicæ*, together with a Deſcription of the Inſtruments to be uſed. However, the Scalpel, or Biſtory, repreſented by ALBINUS in *Tab.* I. *Fig.* 5. is quite different from that uſed by the Author when I was at *Amſterdam*, and that repreſented here in *Tab.* XXVII. *Fig.* 8. which I had of his Inſtrument-maker, whoſe Name and Mark is there the *Blue Bell*, as may be ſeen in the *Figure*. I therefore cannot ſee any Reaſon for his altering the Knife, ſince that which ALBINUS has repreſented, is not at all preferable to the original one of the Author.

perform

perform his Operation in *Holland*, as I have been informed by ALBINUS, both Father and Son, together with RUYSCH, (another of my Masters in Anatomy and Surgery) and as I have often understood from several other Physicians and Surgeons of *Amsterdam*; but he had also probably received an Account of the Emendations made in JAMES's Method by M. MERI, and the Account of MARESCHALL's Success before mentioned in Dr. LISTER's Book. Thus, being assisted with a chirurgical Audacity, and great Skill in Anatomy, he first, like JAMES and the Ancients, cut through the Perinæum, and then through the Neck[a] and Bladder itself; which M. MERI assures us was the Method constantly first used by JAMES, and as I have often seen him perform it at *Amsterdam*[b]. RAW also made use of the grooved Catheter to cut upon, which M. MERI had recommended[c]; but, like JAMES, he had it made somewhat thicker than common. Then, instead of the *Gorgeret*, he used two ensiform Conductors, male and female, as in *Tab.* XXVIII. *Fig.* 2 and 3. But his Scalpel and Forceps were the same as in the common Method by the *Apparatus Major:* and the Posture in which he placed his Patients, was pretty much like that of JAMES[d], lying on their Backs with their Hips elevated. But then he secured them by Ligatures, in a Manner differing from the common Method, which has been rightly described by few, and is generally altogether neglected by those who have treated on his Method. Tho' I must needs think it a very necessary Part in the History of his Operation; and the more, as his Method of tying the Patient was not so terrifying as the common, which M. TOLET asserted to be the Occasion of great Fear in the Patient, and M. WINSLOW even instances Death brought on by the Fright. See his Epist. *in* MORAND. *Lib. de Alto Apparatu.* Therefore, instead of the long Bandages which others used to put about the Patient's Neck and Limbs in so formidable a Manner, RAW only applied two short and flat Ligatures made of Flannel, (though they may be also composed of Silk or Linen) each of which were not above four Feet long. The Patient being laid on the Table represented in *Tab.* XXIX. *Fig.* 10. his right Wrist was then fastened with one of the Ligatures by the Loop A to the Leg of the same Side, not at the Ancle, as was the Practice of others, but to the Knee. And the same Method was observed on the left Side. This Method of securing the Patient is so peculiar to RAW, that it has been general-

[a] As is remarked by ALBINUS, the Father, *in Oratione in Obitum* RAVII, *pag.* 29. tho' the Son, and DIONIS will have it, that he only divided the Bladder itself, without touching its Neck.

[b] When I at that Time, and afterwards often performed the Operation on dead Subjects, I always found, that I had divided, not only the Bladder, but also its Neck: but I then imagined myself in an Error, and supposed I did not know the Art of dividing the Bladder only.

[c] The Reason of the Catheter being thicker, or of a large Diameter than the common, was, as RAW told me, that the Knife might the more readily pass into its Groove, and not easily slip out of it again; tho' I am ignorant whether he made the same Remark public in any Dissertation. Nor do I find upon a Comparison made, that it was more incurvated than the common Catheters, as ALBINUS relates: for in the *Apparatus Major* there is required, and constantly used a very crooked Catheter, or of a large Curvature, as GARENGEOT expresses it.

[d] The Situation in which RAW disposed his Patients for the Operation, is perhaps better described by ERNDELIUS in his *Iter Anglicum & Batavum*, pag. 119, than in any other Author; from whence we also learn, that RAW sometimes placed his Patients on a little Box or Chest, when his proper Table was not at Hand. Therefore what GARENGEOT says in his Surgery, *Tom.* II. *pag.* 192. that RAW placed and bound his Patients in the same Manner as for the *Apparatus Major*, is not true.

ly attributed, not to MERI or MARESCHALL, but to him as the Author; and therefore it has been generally termed the RAVIAN Method of Lithotomy: But from the Time of publiſhing the famous Diſſertation of Dr. JAMES DOUGLAS upon the *Lateral Operation* at *London* in 1726, which was afterwards tranſlated from the *Engliſh* into *Latin* at *Leyden* in 1728. I ſay, from that Time it has been denominated the *Lateral Operation*. Since that, the Method has been performed, amended, and deſcribed by Mr. CHESELDEN at *London*, who alſo calls it the *lateral* Operation or Inciſion for the Stone; becauſe in that Method the Inciſion is made more on one Side of the Perinæum, and the Bladder is alſo inciſed laterally: whereas in the *Apparatus Major* the Inciſion is made in the Urethra only.

I was the firſt that performed this Method after RAW.

XIV. Before I proceed to acquaint you with the Emendations which have been made at Times in this Operation, I ſhall firſt remark a few Particulars relating to the Author of it, and his Manner of performing the ſame, according to my own Obſervation. Having finiſhed the Courſe of my Studies in *Germany*, and being taken with the Fame of the celebrated *Dutch* Profeſſors in Phyſic, I went next to *Holland*, and there ſtayed about five Years, to improve myſelf chiefly in Anatomy and Surgery, on which I had placed moſt of my Affections. For the firſt Part of that Time I reſided at *Amſterdam*, continuing my Studies under RUYSCH and RAW: but towards the latter Part, I began to teach other young Students in Anatomy and Surgery; ſo that I had at the ſame Time not only an Opportunity of ſeeing RAW perform his Operation, but I had alſo the Privilege of imitating him, and demonſtrating the ſame to others upon dead Subjects, ſince the public Profeſſor and my Maſter RUYSCH had given me Liberty to diſſect dead Bodies in the Hoſpital, when I ſhould think proper, and apply them to chirurgical Uſes. By this means I became at length ſo expert in the Knowledge and Performance of the Operation, that I could hardly doubt of ſucceeding if I made Trial on a living Patient. Now in the Year 1709, when *Tournay* was beſieged by the united Provinces, I having been made Phyſician to the Camp, thro' the Recommendation of Profeſſor RUYSCH in the Year 1707, I therefore at that Time attended the Hoſpital erected for the Sick and wounded at *Oudenarde:* where, among other Patients I met with a Lad of about fifteen Years old, afflicted with the Stone in his Bladder, whom I cut, and freed from a Stone, weighing two Ounces, by the RAVIAN, or lateral Method of Lithotomy, in the Preſence of D. DE QUAURE, Surgeon in chief, with ſeveral others; and my Operation, which was performed in *Auguſt*, ſucceeded very happily. In the Year 1710 I was called to take up the Profeſſor of Phyſic, Anatomy, and Surgery at *Altorf*. But I firſt went over to *England*, and endeavoured to improve myſelf by conferring with the moſt eminent Surgeons and Phyſicians at *London*, particularly CYPRIANUS, RUSSIERE, and LAVATERE: and towards the End of the ſame Year I returned to the Univerſity of *Altorf*. There, in the Year 1712, I cut a Lad of Seven Years old, by the RAVIAN Method of Lithotomy, as I had juſt before explained it in my Chirurgical Lectures and Demonſtrations, and thereby extracted the Stone, in the Preſence of a great Number of Students in Phyſic. The Operation being afterwards repeated many Times by me at *Helmſtadt*, and elſewhere. From whence I think it appears, that I

was

was the first, as far as I can hear, who performed this Method of Lithotomy, after RAW, upon living Patients: which I had not only explained and demonstrated in my Chirurgical Lectures from the Year 1708, by performing the same frequently on dead Subjects; but I also gave the following short Description of the Operation in the first Edition of my Surgery, printed in the *German* Tongue at *Norimberg* in the Year 1718, in § XI. of the Chapter on Frere JAQUES's Method of Lithotomy. In that Place, after shewing that the Method, as JAMES originally performed it, was very unsuccessful and despicable; I observe, that there were several judicious Surgeons and Physicians, who thought it might be more useful than the common Method in several respects, when executed by expert and knowing Hands, such as were skilled in the Anatomy of the Parts, and knew how to amend the Defects of the Operation, as it then stood: for, as it was, none of them would undertake to perform it on living Patients. I there conclude, by observing, that, in my Opinion, RAW seems to have been the Corrector of this Method. For he, as I have seen, used to follow the Method of JAMES, as to the Place of his Incision; but he exchanged the Instruments, and used a grooved Catheter to cut upon, afterwards introducing a male and female Conductor into the Bladder, in the same Manner as for the *Apparatus Major:* by which means the Operation happily succeeded with him. And, soon after, comparing this Method with the *Apparatus Major* in § XII. I observe that in JAMES's Method, as improved by RAW, it is difficult to make the Wound so deep as to cut into the Groove of the Catheter in the Bladder, without injuring the adjacent Parts, which would not be so much endangered in the *Apparatus Major.* Which Observation I find to have been since published by others, without mentioning my Name. And this was the brief Intimation which I thought sufficient at that Time to inform the Skilful, who might be desirous of trying and improving the Method which lay then in Silence and untouched by any body but myself. But as the Operation has been since so much esteemed and practised, and the Subject of many Dissertations, I have therefore now been much more particular in relating every thing concerning RAW, and his Method, to compleat the History of his Operation, more especially with regard to what has escaped others, and fallen under my own Cognizance.

XV. Besides the Observations which I have communicated at § XIII. foregoing, relating to his Instruments, *&c.* it may also not be amiss in this Place, to take notice of a few Particulars relating to the Life of this great Lithotomist. And, first, M. GARENGEOT asserts, that RAW obtained his Doctor's Degree through the Procurement of the Senate at *Amsterdam*, in Consideration of his great Skill and Merit in Surgery, in order to qualify him for the Professorship of Anatomy. But M. GARENGEOT appears to be in an Error with regard to this. For our Lithotomist had taken his Degree long before he performed any Operation at *Amsterdam*, even before his Name or Person were at all known in that City. He obtained his Doctor's Degree in the usual Manner at *Leyden*, after he had travelled from *France* thro' *Holland* to *Leyden* in the Year 1694; After this, as ALBINUS the younger observes, in the Life of our Lithotomist, he was harassed with an itinerant Life till he fixed his Seat at *Amsterdam*, where he first began to teach Physic and Anatomy to others, and particularly

Other Observations relating to RAW.

Surgery; which he practiſed with great Induſtry. It is not therefore true, that he had his Degree in the Method aſſigned by GARENGEOT. Nor is it true, that he, by the ſame Means, acquired the Profeſſorſhip of Anatomy in the ſame City: For the Chair had been filled by RUYSCH above thirty Years before RAW was ſo much as known in *Amſterdam*. It is alſo well known, that RUYSCH executed that Office all the Time with great Aſſiduity and Applauſe, even till his own Death, which was a long Time after that of RAW: nor is it probable that a Man ſo well qualified and deſerving as RUYSCH, ſhould be diſplaced from his Profeſſorſhip, without any manifeſt Cauſe, in order to confer it on a Stranger, whoſe Abilities were much inferior. I may alſo juſtly affirm, that RAW had not ſo much as the ſecond Place to the Profeſſorſhip of Anatomy at *Amſterdam*: but all that he taught was in private to Pupils at his own Houſe, among whom I entered myſelf as one. It is alſo a juſt Obſervation of ALBINUS, that RAW applied himſelf more to the Practice of Surgery than Phyſic at *Amſterdam*; for I am certain that he did not much care to be concerned in the Treatment of internal Diſorders: and, to ſpeak the Truth, he was not ſufficiently qualified for that Buſineſs. Sometime after the Departure of JAMES from *Amſterdam*, in his Tour for *Paris*, RAW made a cloſer Application to Lithotomy than he had ever done before; and, ſucceeding in an extraordinary Manner, he was at length honoured with the Title of the *States Lithotomiſt*. However, we muſt not forget to mention, that, in his Courſe of Operations, which he demonſtrated to young Students, when he came to the Subject of *Lithotomy*, his Phraſe was: "That he had nothing to ſay upon that Head, becauſe it was the Means by "which he ſubſiſted, and got his Living: and I had rather be ſilent, than pro-"poſe any thing which might miſlead you from the Truth. But, ſays he, if "you can learn it by ſeeing me perform the Operation upon living Subjects, "you are welcome, and for the reſt you may read CELSUS." This indeed was a Token of his Avarice, and ſeemed to me a kind of Myſtery for a long Time: till at length I concluded that he cut upon the Catheter in that Part of the *Perinæum*, which had been pointed out by CELSUS to be inciſed, upon the Stone without a Catheter. I remember that, while I was engaged with him, he had a Deſign to publiſh a Diſſertation upon ſome Subjects, which had been neglected by other Surgeons, chiefly in the Eye and Ear: (for I believe he wanted either Application or Ability to engage in any larger Subjects,) in which he particularly deſcribes a Proceſs of the *Malleus*, called from him the *Proceſſus Ravianus*; which, he has declared to me and others, was accurately expreſſed in Copper-plates then in his own Cuſtody. But I do not underſtand that he ever publiſhed this Treatiſe, nor any other, except the Oration at his Inſtalment into the Profeſſorſhip of Anatomy and Surgery at *Leyden*, after the Death of BIDLOW. Laſtly, I muſt not omit that M. DENYS, Surgeon and Lithotomiſt at *Leyden*, writes in the Preface and Introduction of his Treatiſe upon cutting for the Stone, that he had taken upon him to make the ſame publick to the World, that it might receive the Benefit of the Obſervations, which had occurred to him in the Practice of Lithotomy, as it had been performed by RAW, to whom he was an Aſſiſtant. Notwithſtanding which, as I have once before obſerved, he does not ſpeak a Word of the true Manner in which RAW uſed to cut his Patients; which, as he tells us, was revealed to him juſt before the Death of his Maſter.

ſter. But the whole Drift of his Diſcourſe ſeems only to prove, that this Method of Lithotomy was better than the reſt, that RAW was the Inventor of it, and that he himſelf continued to exerciſe it with Succeſs.

XVI. The celebrated *Engliſh* Surgeon Mr. CHESELDEN (who had for ſome Time practiſed, after DOUGLAS, the high Operation, or *Apparatus Altus*, with wonderful Dexterity and Succeſs) endeavoured to improve RAW's Lithotomy, by varying the Practice, and adding more convenient Inſtruments. But the very firſt to whom RAW's Method of Lithotomy owes any Improvement in *England*, was BAMBERY, who performed the Operation in the publick Hoſpital at *London*, as we are informed by DOUGLAS, in his Hiſtory of the *Lateral Operation:* who there tells us, that he followed RAW's Method in every reſpect, except that he uſed previouſly to diſtend the Bladder with Water before the Operation, by which Means he cut and freed ſeveral Patients from the Stone, with Succeſs equal to that of RAW. But it gives me no ſmall Concern that DOUGLAS ſhould not have informed us in what Manner the Water is to be conveyed into the Bladder, and retained there after the Extraction of the common Catheter and Introduction of the grooved Catheter; between which it is probable all the Water would in the interim be diſcharged: upon which account this Method of diſtending the Bladder with Water, ſeems to be of little or no Service. But Mr. CHESELDEN has in ſome meaſure changed RAW's Method of Lithotomy, and performs it in the following Manner.

CHESELDEN's, or rather BAMBERY's Improvement.

XVII. His Table, which is of a ſquare Figure for holding the Patient, is higher at that End upon which the Patient is to be ſeated than at the other: the Length of the Table is about three Feet and an half, its Breadth about two and an half, and its Height from the Ground three Feet. The Patient being laid on his Back upon this Table, has a Pillow placed on his Head, and another under his Hips, ſo that his Abdomen lies lower that his Head and Hips. His Buttocks are then drawn a little beyond the Edge of the Table: the Knees are drawn from each other, and bent in a convenient Poſture; and, laſtly, the two Wriſts are tied to each of the Ancles. In this Poſture the Patient is held by three Aſſiſtants; two of which ſecure the Legs and Feet, and the third holds down the Patient's two Shoulders ſo firmly, that he cannot move his Body, or withdraw it from the Hand of the Operator. Mr. CHESELDEN then paſſes a Steel grooved and cannulated Catheter [a] thro' the Urethra into the Bladder after the uſual Manner; and thereby injects a ſufficient Quantity of Water to diſtend the Bladder moderately, without giving the Patient any great Uneaſineſs [b], much in the ſame Manner as in the high Operation. To prevent the Water from returning again out of the Bladder, he makes a Ligature of

Mr. CHESELDEN's Method of Operating.

[a] It is to be wiſhed that Mr. CHESELDEN had delineated this Catheter, ſince it is not eaſy to conceive, by his ſhort Deſcription, how the Catheter could be both grooved and cannulated at the ſame Time.

[b] Which Quantity, he ſays, muſt be always judged of by the Patient's Pain or Uneaſineſs which it occaſions, ſince the Variety of Bladders will not admit of the certain Quantity to be determined; but, as an Example, he tells us, that ſeven Ounces was the Quantity of Water injected into a young Man of eighteen Years old, who had a Stone weighing ſix Ounces.

Flannel upon the Penis, ſo as to compreſs it, the Catheter ſtill remaining in the Bladder [a]. After this he gives the Handle of the Catheter to be held by a prudent Aſſiſtant, not to preſs its Groove towards the Part to be inciſed, as is uſual in the high Operation, and in RAW's Method, but only to take care that it does not ſlip out of the Bladder from the Cauſes we ſhall preſently mention. This done, Mr. CHESELDEN places himſelf in a Chair, correſponding to the Height of the Table and Patient, ſo that he may perform the Operation ſitting. He then makes an Inciſion with a round-edged Scalpel, beginning about an Inch above the Anus on the left Side of the Perinæum betwixt the Accelerator-muſcle of the Urethra and the Erector-penis in the Manner of JAMES and RAW, and deſcending obliquely downwards towards the Out-ſide of the Sphincter-muſcle of the Anus, divides about the Space of two or three Fingers-Breadth, more or leſs according to the Patient's Age or Size: and this Inciſion he makes at once thro' the whole Skin, Fat, and Part of the Levator-muſcle of the Anus, contrary to RAW, who divided the Parts by ſeveral Inciſions. When he has done this, he introduces the Fore-finger of his left Hand into the Wound, and thereby preſſes the Rectum to the other Side, that it may not be injured by the Knife: then he takes another Scalpel of a falciform, or a crooked Figure in his right Hand, and paſſes the Point thereof by the Side of his left Fore-finger ſtill remaining in the Wound, 'till it has pierced the Bladder [b] between the *Os Iſchium* and ſeminal Veſicle; and turning the Point of the Knife upwards, he continues to enlarge the Inciſion therewith, 'till it again comes out at the upper Part of the Wound where it entered. The Bladder being thus opened [c], he paſſes the Fore-finger of his Left hand into its Cavity, and thereby feeling the Stone, and holding it firm, he introduces a Pair of Forceps without any Conductor over his Finger, and therewith endeavours to lay hold of the Stone: which when done, he withdraws his Finger, and graſping the Forceps with both his Hands, he endeavours to extract it with more or leſs Force, in Proportion to the Size and Figure of the Stone, and Width of the Wound. If there ſhould be more Stones than one, he again introduces his Fore-finger, and then the Forceps into the Bladder, and proceeds to extract them as before. During the whole Operation he always leaves the Catheter in the Urethra and Bladder; and the Aſſiſtant who holds it, does nothing more than prevent it from moving in, or falling out of the Urethra: and in this Manner Mr. CHESELDEN thinks the Bladder may be ſufficiently divided for introducing the Forceps over his Finger without any Conductor. And as the Bladder is before filled with Water, it is neither neceſſary nor poſſible to cut through it into the Groove of the Catheter; nor is there any Danger of laying hold of the Catheter with the Forceps, if the Stone be in this Manner directed to it by the

[a] But we are not told by DOUGLAS in what Manner Mr. CHESELDEN prevented the Water from eſcaping out of the Bladder thro' the Catheter: The Ligature will indeed prevent it from paſſing betwixt the Catheter and Urethra, but will not hinder it from coming through the Cavity of the Catheter; which therefore muſt be cloſed by another Ligature, the Finger, or ſome other Means.

[b] I ſuppoſe he was certified that the Knife was in the Bladder by the Efflux of the injected Liquor: but of this DOUGLAS makes no mention.

[c] I imagine he muſt alſo divide the Neck of the Bladder, tho' he does not mention it.

Fore-

Fore-finger. In this Method only one or two ſmall Arteries are divided, ſo that there is no great Danger of any Hæmorrhage enſuing, which ſeldom happens: but if, after the Wound has been cleanſed with a wet Spunge, the Blood ſhould continue to flow, thoſe ſmall Arteries which are divided, are then to be taken up with a crooked Needle and Thread, as repreſented in *Tab.* XXXI. *Fig.* 14. And the Wound being dreſſed with dry Lint, ſpread with ſome digeſtive Ointment, and ſecured with proper Compreſſes and Bandages, the Patient may then be put to Bed. In this Manner, if no extraordinary Impediment occurs, Mr. CHESELDEN performs the whole Operation in the ſpace of one Minute, computing from the firſt Entrance of the Knife till after the Stone is extracted, as DOUGLAS informs us.

XVIII. In the mean time it is to be obſerved, that Mr. CHESELDEN is ſometimes obliged to vary his Method of operating according to particular Circumſtances. As when, 1. He has taken hold of the Stone, and in endeavouring to extract it, perceives, from its great Reſiſtance and other Signs, that it is a very large one, rather than put the Patient to extreme Torture, by forcing it thro' and lacerating the Wound, he chuſes to enlarge it by making a ſecond Inciſion, either with a Scalpel or Sciſſars. 2. After the Inciſion is made, if he perceives the Catheter to be ſlipt into the Wound, as he paſſes his Finger thro' it into the Bladder, he withdraws his Finger, and paſſes[a] a Conductor, or the Gorgeret in its ſtead, into the Groove of the Catheter, over which he again paſſes the Forceps in the uſual Manner into the Bladder: and upon this Account, as the Accident may frequently happen, he generally prefers the grooved Catheter before the common one. 3. If the Aſſiſtant, who holds the Catheter, ſhould perceive that it is taken hold of by the Forceps, either with or without the Stone (which is an Accident that Mr. CHESELDEN affirms not to be often met with) in that Caſe he orders the Catheter to be drawn out, and then tries to lay hold of, and extract the Stone, without that Advantage which the Catheter might otherwiſe afford, by preſſing down the Bladder, for the more eaſy Admiſſion of the Forceps over the Finger to the Stone in the Bladder. 4. When by reaſon of the Smallneſs, or Situation of the Stone, he thinks it may be more convenient to preſs it thro' that Wound, as in the *Apparatus Minor*, he then does it by introducing his Fingers into the Patient's Anus, without making uſe of any Forceps. 5. When he perceives any Reſiſtance to the Stone in its Extraction; or if there is any Conſtriction of the Parts occaſioned either by the Ureter, or Membranes, or uncommon Folds of the Bladder intercepting it, he then alſo introduces his Fingers into the Patient's Anus, and thereby endeavours to thruſt the Stone to the Mouth of the Wound, where he divides the Membranes, or whatever elſe might obſtruct its Exit; and thus the Stone being ſet at Liberty is eaſily extracted. From hence, ſays DOUGLAS, one may eaſily perceive, what Alteration and Correction has been made in RAW's Method of Lithotomy by the acute Mr. CHESELDEN: which ought to be the more regarded, as thereby he has happily cut and cured many, that have been

Some Accidents and Cautions.

[a] Why the Conductor ſhould in this Caſe be neceſſary, and the Finger not ſufficient, as at other Times, I cannot comprehend.

violently afflicted with the Stone; insomuch that DOUGLAS[a] tells us, that in the Time he then writ, there was not one Patient, who miscarried under his Hands. However, he advises one thing more, which he thinks necessary towards compleating the Operation; and that is, to have the Forceps made a little crooked, which in some Cases has been used by Mr. CHESELDEN to much more Advantage than the straight ones. He says he has frequently observed, that the Stone may be extracted with much more Ease when it lies near the Wound, than in the opposite Side of the Bladder; especially if there should be some preternatural Sinus in that Part as it sometimes happens: in which Case the Stone may be more easily intercepted, and extracted by a Pair of crooked, than straight Forceps.

Another Method of Mr. CHESELDEN's.

XIX. But however commodious, easy, and safe this Method of Lithotomy might at first appear to DOUGLAS and CHESELDEN, we find that it was rejected soon after by the last; because it frequently occasioned, as he says, a fetid Ulcer in the *Cellular Membrane*, near the Rectum, by the Insinuation of the Urine: he therefore contrived and approved of the following Method: First, he tied the Patient as usual for the *Apparatus Major*; but laid him upon an even Table covered with several Clothes, and about three Feet from the Ground, only elevating his Head a little higher than the rest of his Body. After this he makes as large an Incision as the Parts will admit of, beginning in that Part of the Perinæum where the Incision of the *Apparatus Major* usually ends, and continuing the same downward between the Accelerator-muscle of the Urethra, and the Erector-penis on the left Side of the *Intestinum rectum*. He then searches for the Catheter in the Wound; and having found it, cuts through the prostate Gland straight forward into the Bladder, at the same Time pressing the Rectum to one Side with the Finger of his left Hand, to prevent it from being injured by the Knife. The remainder of the same Operation is performed in the same Manner as for the *Apparatus Major*; only if he has divided any large Blood-vessels, they are afterwards taken up with a Needle and Thread.

Explained more at large by DOUGLAS.

XX. What has been briefly declared by Mr. CHESELDEN concerning this Method of operating, is exemplified more at large by DOUGLAS, in an *English* Treatise, entitled, *An Appendix to the History of the lateral Operation*, 4to, in the Year 1731. In the first Place he proceeds as in the *Apparatus Major* and lateral Operation: that is, he places the Patient upon the Table, and secures him in a proper Posture with Ligatures, as we mentioned before § XVI. after which he passes his Catheter (represented in *Tab.* XXXI. *Fig.* 5.) in the usual Manner into the Bladder of the Patient. But as soon as the Incision is made in the external Parts, as we before mentioned, he directs the Point of his Scalpel towards the Catheter; which differing from the common, is represented in *Tab.* XXXI. *Fig.* 8. With the Point of this he makes his Incision successively thro' the posterior Part or Bulb of the Urethra, through the Neck of the Bladder and prostate Gland, and Part of the Bladder itself, cutting through them in a right Line into the Groove of the concave Part in the Catheter, *Fig.* 4. and 7. See *Tab.* XXIX. *Fig.* I K L. Having thus made his Incision sufficiently large, he rises from his Chair, and passing the Fore-finger of his Left-hand into the Wound, gently dilates it for the Passage of a particular kind of Conductor

[a] In his Hist. of the Lateral Operation, in *English*, p. 87.

resembling

reſembling the Gorgeret *Tab.* XXXI. *Fig.* 9. but with a crooked Handle marked AA. The Point of this Inſtrument he paſſes into the Groove of the Catheter, that it may be held more ſecurely in its Situation: having felt the Stone, he takes the crooked Handle of the Conductor in his left Hand, and, drawing out the Catheter, introduces his Forceps, *Fig.* 11. whoſe Structure at the Hinges is a little different from the common. Theſe he paſſes with the ſmooth Side upward thro' the Groove of the Conductor into the Bladder: then he draws out the Conductor, and feeling the Stone with the End of the Forceps as yet ſhut, he opens them ſo as to intercept the Stone; and applying both his Hands to the Inſtrument, his left Hand to the Middle, and his right to the Extremity of its Handle, endeavours to extract the Stone gradually, that the Parts may dilate and give way. To promote which he gently turns round the Forceps, and moves it in all Directions, taking care at the ſame Time that the Stone does not ſlip out: but if it happens to ſlip, he endeavours to recover it without extracting the Forceps. If the Stone is large and ſmooth, being lodged in the Cavity of the Bladder near the Wound, he extracts it with great Eaſe from all Patients of whatever Age. But if he finds the Stone to be very ſmall, or inconveniently ſituated, ſo that it cannot be intercepted by the Forceps, he extracts that Inſtrument, and introduces his Finger into the Bladder, in order to turn the Stone, and free it from the Wrinkles of the Bladder. He then paſſes his Conductor over his Finger, which he immediately withdraws, and turns the concave Part of the Conductor upward; thro' which he at laſt conveys his Forceps to intercept and extract the Stone as before, but very ſlowly and cautiouſly. Laſtly, to prevent the Stone from breaking in its Extraction, he thruſts one or two of his Fingers betwixt the Cheeks of the Forceps, that they may not pinch the Stone too violently. But if it ſhould break notwithſtanding this Precaution, or if there are more Stones than one, he repeats the Operation of paſſing the Forceps with his Finger to intercept and extract each of them; which, when cautiouſly performed, he aſſures us is not attended with any Danger. He makes his external Inciſion in the ſame Part with JAMES and RAW; but he continues it much higher and lower, that his Inſtruments may meet with the more eaſy Paſſage into the Bladder, and the Stone by that Means be more readily extracted. But internally when he has divided Part of the Urethra, the Neck of the Bladder, and Part of its Body, if the Stone be large he continues the Inciſion, without injuring the Rectum, which is very liable to be wounded in the lateral Operation; and thus he commodiouſly extracts Stones of a very large Size. If any ſmall Artery is divided, and bleeds exceſſively, he takes it up with a ſmall crooked Needle and Thread when it lies ſuperficially: but when it is deeply ſituated, ſo that he cannot come at it with a Needle, he endeavours to ſtop the Blood with a ſtyptic Liquor. Having extracted the Stone, he then dreſſes the Wound with a digeſtive Ointment ſpread on Lint, and retained with a ſlight Bandage: then the Patient is conveyed to Bed, and the Lips of the Wound are brought together gradually by tightning the Bandage at each Dreſſing, which, after the firſt Time, is uſually twice a Day. From hence, ſays DOUGLAS, it appears that this Method of CHESELDEN is compoſed partly of the *Apparatus Major*, and in Part of RAW's Method of Lithotomy; but in my Opinion it ſeems altogether to be RAW's.

XXI. We

Mr. CHESELDEN's third Method.

XXI. We are farther to obſerve, that the ingenious and diligent Mr. CHESELDEN did not here ſtop ſhort in his Reſearches and Experiments, but has endeavoured to make ſtill farther Improvements in his Method of Lithotomy, chiefly with regard to his Inciſion internally; which he performs by directing the End of his Knife (after enlarging the external Wound, from the Scrotum to the left Side of the Anus, and raiſing the Catheter by the Help of an Aſſiſtant towards the Union of the *Oſſa Pubis)* thro' the inferior and lateral Part of the Bladder above the ſeminal Veſicles, and behind the proſtate Gland, till it had reached into the poſterior Part of the Groove in the Catheter. See *Tab.* XXIX. *Fig.* 5. L. He then continued his Inciſion forwards thro' the Sphincter of the Bladder and left Side of the Proſtate, into and through the membranous Part of the Urethra, till he arrived at its Bulb, repreſented by K I F much in the ſame Manner as is deſcribed in his firſt Method at § XVII. for by that Means he was ſurer to avoid injuring the Rectum, than in RAW's, and the preceding Methods. He alſo aſſerts, that, in the preceding Methods of cutting, the Groove of the Catheter cannot be ſo eaſily perceived and cut into thro' the Bulb of the Urethra: which DOUGLAS, in his forementioned *Appendix*, has declared more at large. M. MORAND propoſes nothing concerning this Method, but declares that deſcribed at § XIX. to be the beſt. Laſtly, among Mr. CHESELDEN's Emendations in Lithotomy, the following are alſo numbered by DOUGLAS. 1. That when he finds the Patient's Pulſe to be very low after the Operation, he applies Bliſters to his Arms, to raiſe his Spirits, which anſwers to good purpoſe. 2. When he perceives the Wound to grow callous, he introduces a bit of Bliſter-plaſter, which erodes it, ſo that new and ſound Fleſh may afterwards ſprout up, and cloſe the Wound. 3. If the Wound is foul or putrid, he mixes a little Verdegreaſe with a digeſtive Ointment.

LE DRAN's Opinion and Obſervations.

XXII. The celebrated M. LE DRAN of *Paris* has a *French* Treatiſe, intituled, *Parallele de differentes manieres de tirer la Pierre hors de la Veſſie*, printed in 1730, in which he endeavours to deliver all the Methods of Lithotomy, that of CELSUS only excepted, which have been to this Day at any Time practiſed: and after making an accurate Examination into them, not only illuſtrates them with many Experiments upon dead Subjects; but alſo with great Induſtry remarks the Structure of the Parts to be divided, with the Advantage and Diſadvantage to which each Method is liable. From whence he concludes, that one Method is only preferable to the other, according to the particular Circumſtances of the Caſe; and therefore he adviſes every prudent Surgeon, who intends to cut for the Stone, to make himſelf well acquainted both with the Theory and Practice of all the Methods of Lithotomy, which may in any Caſe be practicable. In the mean Time he eſteems the Method of cutting by the *Apparatus Major* to be preferable, on ſeveral Accounts, to the reſt, if it be performed with Diſcretion, and particularly having a Regard to what has been ſaid in § VII. and VIII. upon the *Apparatus Major* from the ſame Author, and chiefly to obſerve, that the Neck of the Bladder be ſufficiently divided, and afterwards dilated gently with the Fore-finger and a Conductor: for by this Method it moſt commonly ſucceeds well, is performed with great Safety, and occaſions leſs Pain than the Scalpel in the lateral Operation. But when it is done precipitately, as is the Practice of ſome, it occaſions a grievous Laceration

tion of the Part, violent Pain, and other bad Symptoms, which might be avoided by uſing the Finger in this Manner. He therefore juſtly reprehends thoſe Surgeons, who, out of a vain Deſire of being thought more dextrous than the reſt of their Brethren, endeavour to introduce the Forceps, and extract the Stone with uncommon Haſte and great Violence; the Conſequence of which may be Laceration, violent Inflammation, a Gangrene, and perhaps Convulſions, and Death itſelf.

His Opinion on the other Methods.

XXIII. But the forementioned Author does not detract from the Merit of the *Apparatus Altus*, nor of the lateral Operation: but he endeavours chiefly to ſhew, that the Neck of the Bladder and proſtate Gland are divided by the Knife in the lateral Operation, whereas they are gently dilated by the Finger in the *Apparatus Major*. He is of Opinion that the high Operation may be ſafely performed in ſuch Caſes where the Bladder is large, and may be ſufficiently dilated, by diſtending it with Liquor; which he thinks may be reaſonably conjectured, from the Patient's being able to contain a large Quantity of Urine in his Bladder, who has not been ſubject to the Stone for any conſiderable Time. But he judges this to be a pernicious Method for thoſe, whoſe Bladders are ſmall or callous, that it cannot be ſufficiently diſtended; which is generally the Caſe with thoſe, who have been a long Time ſubject to the Stone, and thereby compelled frequently to diſcharge their Urine. He thinks the lateral Operation of RAW and CHESELDEN preferable to the common Method, when the Stone is very large; as it then requires an Inciſion in the Body of the Bladder, which may be enlarged and dilated at Diſcretion, in Proportion to its Size. However, he objects to the Catheter of RAW, which is delineated by ALBINUS; though, to ſay the Truth, the Catheter of LE DRAN himſelf is much ſhorter than that of ALBINUS, which, he ſays, is unfit for dividing the Bladder, ſince it too eaſily and frequently ſlips out of it: and therefore he preſents the Reader with the Finger of another Catheter, which he judges to be more ſuitable for this Purpoſe. See *Tab.* XXXI. *Fig.* 17. which is perforated for ſome Space after a long Aperture marked *e. e.* by means of which the Neck of the Bladder may be compendiouſly inciſed, and an Opening made ſufficient for the Admiſſion of the Gorgeret, the Forceps, and Extraction of the Stone. Beſides this, the Figure of his Knife is repreſented to us, differing from the common, chiefly at its Point, where it is ſharper, *Fig.* 16. which he thinks may be alſo advantageouſly uſed to cut for the Stone, according to the Method both of RAW and CHESELDEN.

His Opinion of the Apparatus Minor.

XXIV. But ſuch a bad Opinion has M. LE DRAN of the *Apparatus Minor*, that he thinks it ought not to be ranked among the other Methods, but rejected as pernicious, except it be for removing the Stone in the Urethra, or extracting it from the Neck of the Bladder. However, if we conſider that the Wound in this Method is made in the ſame Parts, as in the lateral Operation through the Neck and Body of the Bladder, and that thoſe two Methods differ only with regard to the Inſtruments, in the Opinion of myſelf and others[a]; it will from thence follow, that the *Apparatus Minor* is an Improvement of the old Method, and is therefore not without its Advantages. 2. It has been the

[a] Particularly M. WINSLOW, MORAND, FALCONET, &c.

only

only Method in Practice for these XVI. Centuries past, and has been not only exercised with Success during that Space, but was in the last Century, and is at this Day successfully used in several Parts of *Europe* [a]; notwithstanding the *Apparatus Major* is sufficiently known in all Parts. 3. Experience testifies, that it is now daily performed with the desirous Success, especially upon Children and Infants, not only by itinerant Practitioners, but also by MARINUS [b], myself, and many expert Surgeons among the *Italians*. 4. Even in young Men and Boys under fourteen Years of Age, also in Adults, and Men of small Stature this Method of operating may be very well performed [c], as we are sensible of no material Objection, except the Stone should have a rough Surface. 5. Another Recommendation is, that it is practicable with the fewest Instruments, even with nothing more than the Knife: and Simplicity in chirurgical Operations is always a great Recommendation in their Behalf for Practice. We therefore think, that the *Apparatus Minor* ought rather to be retained, and farther improved: and I would strenuously advise, with ÆGINETA and ALBUCASIS, that the Incision be made thro' the same Parts as in the lateral Operation. In Adults, and those who are advanced in Years, it must indeed be confessed, that this Operation is not so suitable; and therefore CELSUS advises it only to Children and Lads under fourteen Years, excluding those from it, who are adult: though even in those it may be sometimes performed with Success, when the several Circumstances are duly considered, as M. MORAND alledges *in Mem. Acad. Reg.* 1731.

GARENGEOT on the lateral Method of cutting.

XXV. M. GARENGEOT, in the first Edition of his Chirurgical Operations, has not said a Word concerning the high Operation, nor of the lateral Method of cutting for the Stone, as if he knew not that there was any such Thing in Being, or in Print. He has, however, in the second Edition of the same Book, inserted the lateral Method of Lithotomy, and extolled it above all others, since he finds it has been the Subject of so many Dissertations both in *England* and *Germany*; tho' he never once made trial of the Operation himself upon a living Subject: but, after his usual Manner, he does not fail to attribute the Honour both of the Invention and Improvement of this Method to his own Country only. When at the same Time the Method had been treated of, before the first Edition of his Book, by a great Number of Authors, as ALBINUS, DOUGLAS, CHESELDEN, BUSSIERE, LISTER, LAUNAY, SAVIARD, ERNDEL, FEHRIUS, and myself. But I hope it is sufficiently apparent, that both the *German* and the *English* Surgeons deserve to be allowed a Share in this Advancement of Lithotomy: for tho' MERY and MARESCHALL were the first

[a] There have frequently been *English* Surgeons and Physicians in *Germany*, who have talked of *the Operation on the Gripe*, or *cutting on the Gripe*, as a very common Practice. And DOUGLAS, in his Lithotomy, tells us, that he continues to cut small sized Men by that Method: and the *Italians* still continue the same Practice. In *France* this Method was in the last Century performed with Success at *Paris*, and elsewhere by the famous RAOUX. The *Apparatus Minor* was also countenanced by TOLET in the last Century; and SAVIARD, a very late Writer in Surgery at *Paris*, tells us in his *Obs.* 86. that he performed this Method on a Girl. To these we may add M. DIONIS in his Surgery, *pag.* 182. And MORAND, *in Mem. Acad. Reg. Paris.* 1731.

[b] See his *Italian* Treatise concerning the more principal and difficult Operations in Surgery.

[c] M. MORAND *in Mem. Acad.* now cited, asserts the Method to be practicable in all Adults without Distinction.

(accord-

(according to Dr. LISTER's Account) who hinted at improving JAMES's Method of Lithotomy; yet we find that both they and the reſt of the *French* Surgeons deſerted the Method ſoon after, and rejected it as both uſeleſs and pernicious. But the Honour of reſtoring this Method to Practice, after it had been rejected by the *French*, is due to RAW, who is the firſt that attempted to reform and practiſe it on living Subjects, and perſiſted in the ſame Method with Improvements, as long as he lived. Next to RAW, myſelf was the firſt Perſon, and then M. DENYS, who practiſed it in *Holland*, till at length it was received and improved by the *Engliſh* Surgeons, who have ſhewn a great deal of Merit herein. So that, if it had not been for others, the Operation would probably have lain for ever neglected and forgot among the *French*; and M. GARENGEOT himſelf would have been perpetually ignorant of it. The Method being thus improved and practiſed with Succeſs in the Hands of other, while it had lain neglected by the *French* for the ſpace of thirty Years, till afterwards many Diſſertations publiſhed on the Subject had made it very remarkable and famous in the learned World; at length the *French* began alſo to embrace it. In order to which M. MORAND put on a laudable Condeſcenſion to travel into *England* in the Year 1729, to ſee, and be preſent with Mr. CHESELDEN in his Operations, contrary to GARENGEOT, and others of the *French* Surgeons, who were perſuaded, that there was nothing to be learned out of *France*[a]. When M. MORAND had learned what he could of M. CHESELDEN, he then returned to *Paris*[b], where he performed the Operation with Succeſs upon ſeveral Patients, as we ſhall preſently relate more at large. During M. MORAND's Abſence, ſeveral of the *French* Surgeons, and particularly M. GARENGEOT, and PERCHET, Surgeon to the Hoſpital *La Charité*, made trial of the Operation upon dead Subjects, according to the Direction of ALBINUS and CHESELDEN. And when PERCHET had by this Means rendered himſelf ſufficiently perfect, he performed the ſame with Succeſs upon a Lad, and was the firſt, according to GARENGEOT[c], who happily performed this Method after JAMES at *Paris*, where he performed his Operation in the following Manner.

GARENGEOT on the lateral Method of cutting.

XXVI. The Patient being prepared, and the Day appointed for the Operation, the Surgeon ſhould firſt order a Clyſter to be adminiſtred, before he proceeds to his Work. After which the Patient is to be ſecured with Ligatures, as in the *Apparatus Major*, and placed upon a Table about two Feet from the Ground oppoſite to a good Light: a Pillow is then to be placed under his Hips, and another under his Head. The Patient being tied, his two Legs are to be held faſt by two Aſſiſtants, and a third Perſon is to hold down his Shoulders, in ſuch a Manner that he cannot ſtir himſelf any way; which is highly neceſſary for the ſafe Performance of this Operation. In the next Place a diſcreet Perſon is to be placed on the left Side of the Patient, in order to hold up the Scrotum, extend the Skin, and retain the grooved Catheter in the right

[a] The ſame proud Opinion ſeems to be alſo entertained by the Author of the Preface to COLOT's Lithotomy, *pag.* 80. & ſeq.

[b] See Memor. Acad. Reg. *Paris* 1731. and GARENGEOT's Chirurgical Operations, Chap. *on the lateral Operation.*

[c] In his Surgery, Chap. *on the lateral Operation.*

Poſition in which it was placed in the Bladder by the Surgeon: and this is done in Imitation of Mr. CHESELDEN; that the Lithotomiſt, having both his Hands at Liberty, may more commodiouſly go thro' his Operation. Then a Steel Catheter made very crooked with a deep Groove, and long Beak, and a broad Handle, being firſt dipt in Oil, is paſt thro' the Urethra into the Patient's Bladder: in which being entered, the Lithotomiſt gently inclines its Handle with his left Hand towards the right Inguen of the Patient, and at the ſame Time ſearches between the Suture of the Perinæum, and Tubercle of the Iſchium with his right Fore-finger, in order to feel the Beak of the Catheter through the Integuments, and to prevent it from touching the Iſchium. The Handle of the Catheter thus diſpoſed, is then held by an Aſſiſtant in his right Hand, in ſuch a Manner, that his Thumb lies upon the upper Part of the Handle, and his Fingers below, taking care that it does not by any means ſtir or move out of its Place; while, with his left Hand, he elevates the Scrotum, and inclines it towards the right Side, in order to extend the Skin of the Perinæum. Then the Lithotomiſt, applying his left Fore-finger to the Suture of the Perinæum, preſſes it obliquely towards the right Thigh, and holding the Knife in his right Hand, firſt divides obliquely thro' the Skin and Fat; beginning about an Inch on one Side of the Suture of the Perinæum, and about a Line above the moſt prominent Part of the Beak of the Catheter, and extending it obliquely[a] down to the Tubercle of the Iſchium, in the Manner of RAW, who made his Inciſion from above downwards, tho' JAMES made his Inciſion from below upwards. With regard to the Depth of the Inciſion it is to be obſerved, that in lean Patients it may be done at once: but in thoſe who are fat and more robuſt, it may require two or three Strokes with the Knife, more or leſs according to the Judgment and Dexterity of the Surgeon. This done, the Lithotomiſt then paſſes his left Fore-finger thro' the Wound; not to preſs the Rectum on one Side, to prevent it from being injured in the Manner of M. CHESELDEN, but to find and obſerve the Groove of the Catheter; that, if it be diſplaced, it may be again rightly diſpoſed. For the Rectum is in no Danger of being injured by the Knife, when the Inciſion is performed according to the preceeding Direction: nor is there any Difficulty of ſearching for the Groove of the Catheter. Then to make the ſecond Inciſion the Lithotomiſt requires each of the Aſſiſtants to hold the Patient firm, while he paſſes the Knife firſt thro' the Urethra, directing its Point into the Groove of the Catheter, over the Nail of his left Fore-finger: then he proceeds to divide the Neck of the Bladder laterally. And laſtly, by elevating the Knife, ſo that the Back of its Point may be kept within the Groove of the Catheter, and its Edge towards the Body of the Bladder itſelf, he opens it for about a Finger's Breadth or more; in which Procedure conſiſts the chief Advantage of this Method: but then the Fore-finger

[a] There are indeed ſome who endeavour to give out, that RAW performed his external Inciſion in a right Line; from whence they infer, that he did not cut obliquely, but committed many Errors. But I have myſelf often ſeen him cut in an oblique Direction, as ÆGINETA had long before deſcribed in *Lib.* VI. *Cap.* 60. tho' that oblique Inciſion is in itſelf ſtraight, and not lunar, as CELSUS directs. But then the Inciſion was oblique with regard to the Parts, as ALBINUS rightly obſerves, and made from above downwards, or towards the Tubercle of the Iſchium to avoid the Rectum. But then this is obliquely: for a right Line may be, comparatively, either direct and parallel, or tranſverſe and oblique.

ſhould

ſhould follow the Knife, as it divides the Parts, leſt it ſhould ſlip out of the Groove in the Catheter. The Inciſion being thus made ſufficiently large, ſo that the Groove of the Catheter is laid bare for about two Fingers Breadth, the Knife is then withdrawn, the Fore-finger ſtill remaining in the Groove of the Catheter: a Conductor is then conveyed by the right Hand of the Lithotomiſt by the Side of his left Fore-finger, by the Nail of which the Point of that Inſtrument is directed into the Groove of the Catheter. In the next Place, the Surgeon withdraws his left Fore-finger, and with the ſame Hand takes hold of the Handle of the Catheter, which had been till then held by the Aſſiſtant; and inclining it a little towards himſelf at the ſame Time, protrudes the Conductor, whoſe Point is in the Groove of the Catheter, into the Cavity of the Bladder: which may be judged to be rightly performed, when the Urine runs out both thro' the Inſtrument and the Wound. This done, the Surgeon then gently extracts the Catheter, by moving it a little from one Side to the other. Then he takes the Handle of the Conductor into his left Hand, and paſſes his right Fore-finger thro' its Channel into the Bladder, thereby gently dilating the Wound, for the more eaſy Admiſſion of the Forceps; which are next conveyed with his right Hand thro' the Cavity of the Conductor into the Bladder. After which, with his left Hand he extracts the Conductor, and ſtrongly opens the Forceps, to make a further Dilatation of the Wound, then ſhutting them again, he ſearches for the Stone, which being intercepted by the Forceps, is extracted by them, as we before directed. The Stone being extracted, the Fore-finger is then paſt into the Bladder, to ſearch if there be any other yet remaining: if ſo, the Forceps are again introduced over the Finger to the Stone, and its Extraction performed like the former. Thus you have the Directions for performing Lithotomy according to M. GARENGEOT, who has endeavoured to illuſtrate the ſame by Figures: which are however ſo badly adapted and expreſſed, that myſelf and many others are altogether ignorant of their Meaning. Laſtly, we muſt not omit his great Admonition, agreeable to DOUGLAS, in Oppoſition to ALBINUS junior, that the Bladder alone cannot be inciſed by this Method, without dividing at the ſame Time both its Neck and the proſtate Gland laterally, with a very ſmall Portion of the Bladder, as MORAND obſerves. There is alſo a ſmall Knife exhibited by him, for this Purpoſe, which we have repreſented in *Tab.* XXX. *Fig.* 15, from Mr. CHESELDEN.

Lateral Operation of SENFFIUS.

XXVII. It will not be foreign to our Purpoſe in this Place, to take notice of the ſeveral Improvements in the lateral Method of Lithotomy, which have come under my own Obſervation, either by reading or converſing with other Surgeons in *Germany*, which I ſhall therefore communicate for the public Good. But in this Place I ſhall only propoſe what has been done in this Matter by SENFFIUS, Surgeon to the King at *Berlin*, at which Place he was alſo Surgeon to the ſplendid and Royal Hoſpital of Charity, alſo Profeſſor and expert Demonſtrator of Chirurgical Operations; but is now, to the great Diſadvantage of Surgery, deceaſed. However, I ſhall here relate the Manner in which he frequently performed the lateral Operation with Succeſs: and this I ſhall do from the Account given me by my own Son, who reſided a great Part of the Year 1735 and 1736 at *Berlin*, under the Tuition of that celebrated Profeſſor whom he has

has ſeen perform that Operation with great Dexterity, both upon dead and living Subjects. This great Man, who was admirably well ſkilled in all the Operations of Surgery, as well as that of Lithotomy, judged that the Method of cutting by the lateral Operation was preferable to all others, with which we are at this Day acquainted, and uſed to perform the ſame in the following Manner: Firſt, the Patient was placed upon a Table about Knee-high and under him were placed two Pillows, one at his Head, and the other under his Hips, which laſt was then placed over the Edge of the Table, oppoſite to the Light; and his Legs being bent and ſecured with Ligatures in the uſual Manner, were held firm by two Aſſiſtants, (which he omits in Children.) A third Aſſiſtant is placed to hold down his Shoulders: a Fourth kneels down upon the Table over the Patient, in the Manner repreſented in *Tab.* XXIX. *Fig.* 9. D. who with his right Hand draws up the Patient's Genitals, and with his two Fore-fingers extends the Skin of the Perinæum, by which means the Inciſion may be made more accurately, and the Catheter may be more ſenſibly perceived. Laſtly, a fifth Aſſiſtant is placed on the left Side of the Patient, to hold and deliver the Inſtruments. All things being thus ready, our Lithotomiſt introduces a grooved Catheter made of Silver, very ſlender, and more crooked than uſual, as repreſented in *Tab.* XXVII. *Fig.* 15 *a a a*, which being firſt dipt in Oil, and paſſed into the Bladder, he therewith ſearches for the Stone, and convinces the By-ſtanders of its Exiſtence. This done, he kneels down upon his right Knee, in the Manner of RAW, and with his left Hand turns the Handle of the Catheter towards the right Inguen and its Beak towards the Tubercle of the Iſchium, in which Poſition it is held as before: then he cuts through the Integuments between the Anus and Tubercle of the Iſchium in an oblique Direction, with a broad Knife not unlike that commonly uſed in Lithotomy, being in the ſame Manner inveſted with a Slip of Linen. Having made his Inciſion, he claps the Knife into his Mouth, and paſſes his right Fore-finger into the Wound, to feel for the Catheter; which, when found, he takes its Knife, and cuts into the Groove of that Inſtrument in the Manner of RAW. Then holding the Knife firm in the Groove, he, with his left Hand, preſſes the Handle of the Catheter a little towards himſelf, and, holding the Knife in his right Hand, the Edge of it follows the Beak of the Catheter as it moves inward, by which means it farther divides the Bladder, and enlarges the Inciſion. Then he delivers the Catheter to be held in that Poſition by the fourth Aſſiſtant; while he himſelf, with his left Hand, paſſes a male Conductor by the Side of the Knife into the Bladder: after which the Knife is extracted, and another female Conductor, made of Silver like the former, is introduced by the preceeding in the uſual Method. Then having drawn out the Catheter, he, in the next Place, paſſes a Pair of Forceps between the Conductors into the Bladder; and extracting the Conductors, he ſearches for the Stone with the ſaid Forceps, and extracts the ſame with ſo much Dexterity, that he is hardly longer than two or three Minutes about the whole Operation. As for what Parts he cuts through internally, I cannot certainly determine, having never had the Opportunity of examining the Parts after him. But he has declared himſelf, that he only divides the Bladder, which ought only to be done in performing the lateral Operation, after the Manner of RAW, as appears from what has been writ by ALBINUS and myſelf

myſelf concerning that Lithotomiſt. From which Writing SENFFIUS ſeems chiefly to have learned his Method of cutting, which agrees in every reſpect, excepting that his Catheter was more ſlender and crooked, being made of Silver inſtead of Steel. His Reaſon for having it made ſlender was, that it might paſs more eaſily into the Bladder, preferring Silver on the account of its Neatneſs. And by making it more crooked than the common, he could thereby preſs the Urethra and Neck of the Bladder more outward towards the Perinæum: which makes me think that he divided not only the Bladder, but alſo its Neck.

XXVIII. In the laſt Place, M. MORAND, one of the moſt conſiderable Surgeons at *Paris*, and Member of the Royal Academy, reaſons very prudently concerning the ſeveral Methods of Lithotomy; and concludes, that all of them may be uſed by a prudent Surgeon, as the Circumſtances of his Patient require. He rather thinks the Multiplicity of Methods an Advantage, than an Incumbrance, if we regard particular Patients, and the different Circumſtances of their Caſes. Therefore no one Method is to be deſpiſed or rejected, which has Reaſon and Experience to vindicate it. And he aſſerts, that all the Methods have been duly examined and performed by himſelf. But after he had publiſhed a Diſſertation in the Year 1728, concerning the high Operation, he there informs us, that he alſo deſigned to deſcribe the lateral Operation. But when he heard with what great Succeſs and Applauſe, Mr. CHESELDEN had anticipated him in that Deſign, his Inclination led him to be an Eye-witneſs of the Method of Practice uſed by that Surgeon. In order to which he came to *London* in the Year 1729, and not only made a ſtrict Examination into the Method in which Mr. CHESELDEN cut his Patients, but had often Converſations with him upon the ſame Subject, and continued a Correſpondence with him after he had returned to *Paris*, where he performed the Operation firſt upon a great Number of dead Subjects, till he had found himſelf abſolutely perfect in every reſpect. He alſo tells us, that Mr. CHESELDEN had relinquiſhed the high Operation, which he had till then performed ſo ſucceſsfully, with no other View than to try, if he could not improve RAW's Method, ſo as to render it preferable to the high Operation itſelf. He afterwards ralates the Experiments made by Mr. CHESELDEN, partly in Imitation of M. RAW's Method, as deſcribed by ALBINUS, and partly by a previous Diſtenſion of the Bladder with Water: but he alledges, that by both theſe Methods the [a] Urine frequently inſinuated into the cellular Subſtance of the *Membrana adipoſa*, which inveſts the Rectum, ſo as to occaſion foul and putrid Ulcers, of which ſeveral Patients had died. He alſo further adviſes from Mr. CHESELDEN, that the Aſſiſtant who holds the Catheter, ſhould not by any means preſs it outward, becauſe in that Manner it may be eaſy to divide the whole Sphincter of the Bladder: nor ſhould the Wound be made too deep in the *Membrana adipoſa* near the Rectum, leſt the Urine ſhould ſtagnate and putrify there. We may alſo add, that when the Bladder is ulcerated, it may be more commodiouſly cleanſed in this Method, than by any other: and, laſtly, what is a great Recommendation

MORAND on Lithotomy.

[a] I never knew any Accident of this Kind in RAW's Operations; nor did it ever happen to me when I practiſed in this Method.

to this Method of Lithotomy is, that a large Stone, which another Surgeon could not extract by MARIANUS's Method, Mr. CHESELDEN being present, and inlarging the Wound according to his Method, thereby extracted the Stone with great Ease. After many Experiments made in the Presence of M. MARESCHALL, late Surgeon in chief to the *French* King, in Company with many other Physicians and Surgeons, this Method of Lithotomy appeared to succeed very well at *Paris* 1730, according to the Relation of M. MORAND; so that out of sixteen Patients, eight of which were cut by PERCHET, and the other eight by MORAND himself, there was but one of them miscarried: whereas, on the contrary, out of twelve, who had been cut at the same Time, and in the same Hospital by the *Apparatus Major*, no less than five of them were lost. Among the Advantages of this Method we may reckon, with MORAND, that it is more easily and effectually to be performed than the Method of MARIANUS; inasmnch as the Fore-finger proves a certain Guide to the Operator, so that no Danger can attend the Patient. To which we may add, that the Operation in this Way is shorter and less painful than that of MARIANUS, so as to admit the Extraction of very large Stones without much Difficulty. Lastly, he pronounces RAW's Method, as it is described by ALBINUS, too intricate and difficult; and therefore doubts with DOUGLAS, GARENGEOT, and FALCONET, whether ever RAW actually cut his Patients in that Manner: and then M. MORAND concludes by promising to give a more perfect Account of the Method of performing the lateral Operation than we are at present furnished with.

Disadvantages of the *Lateral* Method.

XXIX. Notwithstanding the Encomiums which the *lateral* Method has at this Day acquired, there are yet several Difficulties and Inconveniencies to which this Method is equally liable with the *Apparatus Major*. As (1.) a Fistula *in Perinæo*. (2.) A transverse Position of an oblong Stone of a large Size, whose Figure cannot be certainly known before the Operation is performed, and to extract which the Operator frequently puts the Patient to extreme Torture, without effecting any thing: which may at the same Time be easily performed by the high Operation, or by the *Apparatus Minor*. (3.) The Stone's being situated above the *Os Pubis* in the Form of an Arch, and fastened to the Bladder, in such a Manner that it cannot be separated without endangering the Patient's Life; an Instance of which has been remarked by SERMESIUS and myself[a]. (4.) When the Stone is very small, and lodged in some Cell in the Bladder, or is broke in pieces, which render it very difficult to be extracted by this Method, and is a Difficulty that has been met with both by RAW and SERMESIUS[b]. (5.) This Method is not practicable when the Catheter cannot be passed into the Bladder by reason of some Obstacle. (6.) The Bladder is liable to be injured, pinched, or punctured by the Instruments: which Difficulties and Inconveniencies, with many others of bad Consequence, the learned and experienced SAVIARD, who cut such Numbers of Patients, found often in his Practice; and declares them to be as dangerous in the *lateral* Method as in the *Apparatus Major*. (7.) The lateral Operation is hardly practicable in Women, especially Adults, without great Ha-

[a] See the Preface to DOUGLAS's Lithotomy.

[b] Small Stones and Fragments are ever acknowledged by M. DENYS to be very difficultly extracted by the Lateral Method.

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zard of wounding their *Vagina*, nor have we any Inſtance of the Operation ſucceeding in them: unhappy Inſtances of the contrary, we have indeed ſeveral, in the Practice of JAMES before taken notice of [a]. See alſo SERMESIUS upon this Head, *pag.* 182. who performed this Operation upon many dead Subjects of that Sex; but in none of them without wounding the *Vagina:* and therefore upon this and ſeveral other Accounts the high Operation is in many Caſes preferable to the lateral.

Lithotomy a hazardous Operation.

XXX. After all, it appears that the Operation of Lithotomy is precarious and dangerous, or its Event at leaſt very doubtful, notwithſtanding all the Improvements which have been lately made on it by ſeveral celebrated Phyſicians and Surgeons: nor is there any one Method to be relied on alone, but all of them are practicable to more or leſs Advantage, according to the particular Circumſtances of the Patient's Caſe. Therefore a prudent Surgeon ought to be well acquainted with the Manner of performing all the Methods.

Cautions for chuſing the Method.

XXXI. The *Apparatus Minor* does not well ſucceed when the Stone is full of Prickles; nor when it is ſo large as not to be conveniently held by the Fingers: nor does it ſucceed well in very tall Patients, becauſe in them the Bladder is ſo far diſtant from the Anus, that the Stone cannot be felt, and thruſt towards the Perinæum; in which Caſe I judge the lateral, or the high Method more convenient. On the contrary, in Children, and ſmall adult Patients, where the Stone is not very large nor prickly, and where it may be eaſily thruſt to the Perinæum, we muſt needs think the old Method of cutting by the *Apparatus Minor* to be moſt eligible, as it is very ſimple, and performed by few Inſtruments; (notwithſtanding what others ſay in Oppoſition to it) and particularly when the Stone is fixt in the Neck of the Bladder, it is then the moſt convenient and proper of all others. The high Operation, we are aſſured by Experience, to be very dangerous in old and weak Patients, whoſe Strength is exhauſted, and their Bladder ulcerated, as we have before obſerved § XXI. Whereas, on the contrary, it ſucceeds very happily in Children and young Men, tho' the Stone be very large; as it does alſo when the Stone is very ſmall, ſo that it can hardly be found by other Methods: and when there are ſeveral ſmall Stones, or Fragments, each of them may be commodiouſly extracted by this Method; but you muſt be very careful not to wound the Bladder. Though the Inciſion may be more eaſily performed, and with leſs Danger in the *Apparatus Major*, than in the lateral and high Operation, as in the firſt the Urethra only is wounded; yet we cannot judge that Method to be uſeful, or even practicable, except when the Stone is ſmall and of a ſmooth Surface: but when it is large and rough, there is Danger of a violent Extenſion, Laceration, and Contuſion of the Neck of the Bladder. But if the Bladder be ulcerated, and the Stone not very large or rough, I then think it preferable to the high Operation; as the Bladder may be better cleanſed by an opening in its lower, than upper Part. As for JAMES's lateral Operation, as it ſtands improved by MERIE, RAW, and CHESELDEN, it excells the *Apparatus Major*, as being practicable in leſs Time, and may be uſed for extracting very large Stones: but as the Wound is made in the Bladder itſelf, and penetrates much deeper than in the Method of MARIA-

[a] RAW mentions one Woman that he cut in this Method; but I remember no other Inſtance.

NUS,

NUS, in which the Urethra only is divided in the Perinæum, I muſt therefore think it more difficult and dangerous. For as the Inciſion is to be made very deep through the Parts which inveſt the Bladder, there is great Danger of the Knife's ſlipping out of the Groove of the Catheter, (eſpecially in fat Subjects) ſo as to endanger a Wound of the Rectum, ſeminal Veſicles, and other adjacent Parts, or even the Bladder itſelf, as frequently happened to JAMES[a]. The *Apparatus Major* is a dangerous and difficult Operation, as a large or even middle-ſized Stone, if rough, cannot be extracted without a violent Extenſion, and perhaps a Laceration of the Neck of the Bladder. For when the Neck of the Bladder and proſtate Gland, with the Sphincter and Urethra, are forcibly diſtended, or lacerated by a large or rough Stone, there is great Danger of a profuſe Hæmorrhage, violent Inflammation, and incipient Mortification, if not a Cancer in the Bladder itſelf, or immediate Death; at leaſt an Incontinency of Urine, or a Fiſtula *in Perinæo*, attended with other unhappy Conſequences. So that it is hence apparent, that one Method is preferable to the other, only as it is more or leſs adapted to the particular Caſe of the Patient. In the Method of MARIANUS, and in that only, the Bladder is not wounded in cutting for the Stone: In that Method the Urethra only is divided; whereas in all others, the Bladder itſelf, and even its Body, is inciſed. In the high Operation the inferior and anterior Part of the Bladder is divided: but in the *Apparatus Minor* and lateral Method of cutting, the Bladder is inciſed in its inferior and lateral Part; ſo that theſe three Methods differ more in their Inſtruments, than in the Places of Inciſion, which are pretty near each other.

The Stone ſometimes returns.

XXXII. Laſtly, it is to be obſerved that Patients, who have been once happily cut and freed from the Stone by any Method, are notwithſtanding frequently troubled with the ſame Diſorder again. Thus I remember a Lad, who had been three times cut and freed from the Stone by RAW: and, to inſtance one Caſe out of many, a certain Merchant near *Norimberg*, was obliged to be cut four times, a new Stone being formed every Year, notwithſtanding he was conſtantly under the Care and Treatment of a prudent Surgeon. In like Manner M. DENYS[b] mentions a Man that was five Times cut for the Stone, a very large one being extracted at each Operation. But People ſhould be careful not raſhly to attribute this Relapſe either to the Imprudence or Ignorance of the Lithotomiſt, as it is ſometimes maliciouſly reported to the Damage of his Reputation: for it is in the Power of no Phyſician to prevent the Patient from ever relapſing into the ſame Diſorder, though he may make a perfect Cure of him for the preſent. If the original Cauſe of the Stone ſtill continues in the Patient's Habit, eſpecially a bad State of the Kidneys and Bladder, it will in Time again produce the ſame Conſequence or Diſorder; which will again make it neceſſary to repeat the Operation, if the Patient is deſirous of being freed from his Complaint.

[a] Though the *Veſiculæ ſeminales* may be, and very often are, wounded both in the *Apparatus Minor*, and in the *Lateral* Operation, as LE DRAN and others have obſerved; yet it is not generally attended with any bad Conſequence, as the Parts readily heal up with the reſt that are divided.

[b] *Chirurg. Obſ.* p. 24.

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Fig. 2.

Fig. 1.

Fig. 8.

Fig. 5.

Fig. 7.

Fig. 6.

Fig. 13.

Fig. 14.

Fig. 15.

Fig. 12.

Fig. 9.

Fig. 10.

Fig. 3.

Fig. 11.

Fig. 16.

Fig. 4.

Fig. 17.

Fig. 18.

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An EXPLANATION *of the* THIRTY-FIRST PLATE.

Fig. 1. Repreſents a lateral View of RAW's grooved Catheter, as it is delineated in its true Figure and Thickneſs by ALBINUS. But it is to be obſerved that, in the Years 1706 and 1707, when I was his Pupil, he uſed a common grooved Catheter, like that repreſented in *Tab.* XXVII: only it was a little thicker than the common ones. A denotes a lateral View of its Handle. B the Part which ALBINUS aſſerts to be more crooked than the common ones; though in my Opinion it ſeems to be leſs crooked than thoſe which have been figured, for the *Apparatus Major*, by TOLET, ALGHISH, GARENGEOT, LE DRAN, myſelf, and others. C denotes the Beak of the Catheter, which is longer and ſtraighter than the common.

Fig. 2. Exhibits a flat View of the Handle of this Catheter, which may as well be made in the Form of a Heart like that of the common one in *Tab.* XXVII. or elſe flat and ſolid, as that of Mr. CHESELDEN in *Fig.* 6. *Tab.* XXXI. or with a Ring like that of M. LE DRAN in *Fig.* 17. *a a* of this Table.

Fig. 3. Repreſents the Beak of the grooved Part of RAW's Catheter, in which may be ſeen its thin, but ſmooth and obtuſe Sides marked *a a.* betwixt which is the large Groove marked *b b.* C is the Termination of the Groove, in a ſmooth and obtuſe Point.

Fig. 4. Is a tranſverſe Section of the grooved Part of this Catheter, to ſhew its Form and Depth, that the Knife may not eaſily ſlip out of it.

Fig. 5. Exhibits the grooved Catheter of Mr. CHESELDEN, which is more ſlender, and leſs crooked than that of RAW's and the common ones: *a a* denote the Edge of its Handle in the Shape of a Heart: *b b* the Body of it in a rectilinear Form: *c c* the Curve and grooved Part: *d* the Beak of the Inſtrument, which has little or no Incurvation. DOUGLAS calls it the Roſtrum or Beak which is ſtrait.

Fig. 6. Repreſents the flat ſide of the Handle *(a)* of this Catheter, with Part of its Groove *(c c)* and its whole Body *(b b)*.

Fig. 7. Denotes the ſtrait Beak of the Groove in Mr. CHESELDEN's Catheter, whoſe Sides (marked *a a*) are ſmooth and obtuſe like RAW's; but its End *b* is left open, and not made rounding or cloſed, as in the other Catheters. But I am not ſenſible of any Advantage that attends this particular Make, nor does its Author mention any.

Fig. 8. Is the Inciſion-knife of Mr. CHESELDEN, which he uſes in cutting for the Stone; whoſe Blade is fixed to the Handle *a a*, and its Point directly in the middle.

Fig. 9. Shews the concave Part of Mr. CHESELDEN's Conductor B B. having its Handle A A inclined to the left Side, for the more commodious Introduction of the Forceps through it into the Bladder; C the Extremity of its Beak terminating in a flat Point, ſhewn ſide-ways in *Fig.* 10, and in *Fig.* 11. its Handle is repreſented ſeparate.

Fig. 10. Repreſents the common ſmall Forceps of Mr. CHESELDEN, which he moſt frequently uſes for extracting the Stone. But when the Stone is very

large, he uſes a Pair three Inches longer. AA denote its Handles, which in others are uſually in the Form of Rings, but are here bent in the Form of Hooks. In his larger Forceps he repreſents one Handle in Form of a Ring, and the other like a Hook, as here. BB are the two Jaws or Lips of the Forceps; which are made ſo as not to ſhut quite cloſe, that they may not pinch and injure the Bladder.

Fig. 11. Repreſents the internal Surface of one of the Jaws of theſe Forceps; which is concave, and furniſhed with many ſmall Teeth, inclining backward towards its Handle, that it may hold the Stone firm.

Fig. 12. Gives a lateral View of one of Mr. CHESELDEN's Needles, which he uſes to take up any Artery that may happen to be divided in the Operation.

Fig. 13. Shews the convex and angular Point of the ſame Needle marked *a*; *b* its concave or internal Part, which is ſmooth.

Fig. 14. The Biſtory, or Inciſion-knife of M. LE DRAN. A its Point; BB its two Edges for cutting; CC its two Handles.

Fig. 15. Repreſents a new Catheter of M. LE DRAN, which he uſes for the lateral Operation inſtead of RAW's: *aa* denote its Handle: *ab* its Body: *bbb* its concave or crooked Part: *ccc* the Groove in its convex Part, *d* its obtuſe Point cloſed. The Lines at *ee* ſhew the Length of the Fiſſure in its Groove.

Fig. 16. Exhibits GARENGEOT's Scalpel for Lithotomy by the lateral Method.

CHAP. CXLIV.

Of Puncturing the Perinæum and Bladder.

Puncture of the Perinæum what and where neceſſary.

I. BY the Puncture of the Perinæum is underſtood a Paracenteſis or Perforation made into the Urethra and Bladder, in order to diſcharge the Urine when it is ſuppreſt. But as this Perforation is at preſent made, as well in the Hypogaſtric Region above the *Oſſa Pubis*, as below it in the Perinæum, it would in my Opinion be more proper to term it a Puncturation or Paracenteſis of the Bladder. It is an Operation of ſo much Conſequence, that, if it be not timely performed, the Patient muſt inevitably periſh: but at the ſame Time it is an Operation ſo dangerous, that no one ſhould preſume to perform it, who is not an expert Anatomiſt, and a dextrous Operator. The Puncture of the Perinæum is therefore uſed only in thoſe Suppreſſions of the Urine [a] where it

[a] A Suppreſſion of Urine may proceed either from (1.) a Diſorder in the Kidneys; in which Caſe no Urine is tranſmitted to, or retained in the Bladder: and therefore no Operation in Surgery can be of any Service here. Or (2.) it may proceed from ſome Diſorder in the Bladder or Urethra, as we ſhall here obſerve. If the Urine remains ſuppreſſed in the Bladder, (which may be known by the Pain and Tumor it occaſions in the Region above the *Oſſa Pubis*, with a Weight and Reſiſtance upon the Rectum perceptible to the Finger there) there are then three Methods of diſcharging the Urine: Either, firſt, by the Catheter, when that can be introduced into the Bladder; for which conſult Chap. CXXXVII: Or, ſecondly, by Lithotomy, when a Stone is the obſtructing Cauſe; of which Operation we have largely diſcourſed in the preceding Chapter: Or, laſtly, by an Inciſion or Puncture in the Perinæum, which we ſhall conſider in the preſent Chapter.

cannot

cannot be discharged by the Use of internal Medicines, nor be evacuated by introducing the Catheter: for there may be some Cases in which the Catheter cannot be passed into the Bladder, even by an expert Surgeon, as appears from constant Practice, and has been before observed in *Chap.* CXXXVII. But that the Surgeon may not be ignorant of the Causes, which may prevent the Passage of the Catheter into the Bladder, he should observe that it may proceed, 1. From a violent Inflammation of the Neck and Sphincter-muscle [a] of this Receptacle, whereby the natural Passage of the Urine is sometimes so closely contracted, that the Catheter can by no means be passed through it into the Bladder [b]: and, if forcible Endeavours be used for that Purpose, it frequently not only increases the Inflammation and Pain, but sometimes also contuses the Urethra, so as to bring on an incipient Mortification, and Death itself. 2. The Passage may be obstructed by some Caruncle, Cicatrix, or a hard Tubercle. 3. It frequently proceeds, in old Men, from a Stricture or Shrinking of the Urethra, or by forming Wrinkles so as totally to block up the Passage of the Urine. 4. It may be caused by too great Distension of the spungy Substance of the Urethra with Blood, whereby its Canal may be so closely compress, as frequently to deny a Passage to the smallest Tube. 5. It may proceed from a Schirrosity, or preternatural Tumor of the prostate Gland, which has been observed by the celebrated Morgagni [c], and by Colot, and lately by myself in a Man at *Helmstadt*. 6. It may be occasioned from a Stone wedged into the Urethra, or Neck of the Bladder, so that neither the Urine nor Catheter can have any Passage. Therefore in any of these, or the like Cases, when the Urine cannot be discharged from the Bladder, neither by passing the Catheter, nor exhibiting Medicines recommended in *Chap.* CXXXVII. the Surgeon must then have immediate recourse to the present Operation, or the Patient will be inevitably lost.

First Method of puncturing.

II. There are several Methods to perform this Operation, each of which we shall briefly describe. Leauneau tells us, there is nothing more required in this Operation, than to place the Patient in the same Posture as in cutting for the Stone; and then to make a large Incision in the Perinæum, cutting through the Urethra into the Groove of the Catheter, as in the *Apparatus Major:* after which he passes a Conductor or Gorgeret in the Groove of the same Catheter, gently passing it through the Neck of the Bladder, so as to make way for the Urine. But Leauneau does not consider, that this Operation is not necessary when the Catheter can be passed into the Bladder: for then the Urine may be discharged through its Cavity without cutting, which ought only to be performed when that Instrument can find no Admittance into the Bladder. I shall therefore proceed to describe the Methods which are to be used, when the Catheter cannot by any Means be introduced. The first and most common of these

[a] This may be known by the Heat and Pain felt by the Patient in his Perinæum, especially upon any Pressure there with the Finger, *&c.* and it will be still more sensible to the Surgeon if he introduces his Finger into the Patient's Anus.

[b] What Medicines are proper to be used in Suppression of Urine from an Inflammation of the Parts, before our Chirurgical Helps are called in, we intimated before in Chap. CXXXVII. § I.

[c] See his *Adversaria Anatomica* III. *pag.* 83. where he has observed a fatal Suppression of the Urine from this Cause. But he does not say whether this Operation had been performed.

Methods, which has been hitherto uſed, as well by the Ancients as Moderns, is as follows. See Dionis's Chirurgical Operations, Demonſtration III. The Patient is firſt to be placed upon a Bed or Table in the ſame Poſture as in cutting for the Stone, being ſecured by two or three Aſſiſtants. Then the Surgeon makes an Inciſion on the left Side of the Suture in the Perinæum, with a ſmall and double-edged Knife, like that repreſented in *Tab.* I. *lit.* I. with which he cuts down into the Bladder. If the Urine ruſhes through the Wound, it is a certain Sign of his having entered the Bladder, but he ſhould not draw out his Knife before he has paſſed a Probe firſt, and then a Silver-Tube by the Side of it into the Bladder, which Tube may be about four Fingers Breadth, made like that repreſented in *Tab.* II. *lit.* P. *Tab.* XXIV. *Fig.* 3. or in *Tab.* XXXII. *Fig.* 4. This Tube being left in the Wound, is to be there held firm by a flat Bandage paſſed round the Hips: and, after the Urine is thereby diſcharged, the Tube is to be ſtopt with a Tent, to prevent it from continually flowing out. Whenever the Patient wants to make Water, the Tent is then to be extracted, and afterwards inſerted into it again: which Proceſs is to be repeated when neceſſary, till the Inflammation, and other Symptoms of the Diſorder, are all removed. This firſt Method is indeed ſomewhat dangerous and ſevere, becauſe thereby the Neck of the Bladder and Urethra are generally cut through without any Neceſſity, whereby the Inflammation becomes more violent, and at the ſame time alſo the ſeminal Outlets in the proſtate are uſually very much injured.

A ſecond Method.

III. It is therefore a ſafer and more commodious method in my Opinion, if the Inciſion is made in the ſame Part of the Perinæum, and with the ſame Inſtruments, as are cuſtomary in the *Apparatus Minor*, or in the lateral Operation, cutting into the Body of the Bladder, without injuring its Neck: after which a Silver Tube may be introduced, and the Urine diſcharged as before. By which means the Neck of the Bladder and Urethra are preſerved entire, and the Pain and Inflammation are not increaſed; but the Wound heals up much ſooner and with more Eaſe than in the common Method.

A third Method.

IV. There is ſtill a third Method, which ſeems to be preferable to either of the preceding, which conſiſts in perforating the Perinæum and Bladder in the ſame Part, but with a Trocar inſtead of a Knife; the Figure of which Inſtrument may be ſeen in *Tab.* XXIV. *Fig.* 1. The Trocar being paſſed into the Bladder, its triangular Bodkin is then immediately extracted, while its Cannula remains in the Wound, and gives a freer Paſſage to the Urine in the Bladder: which Operation is not only more eaſy and expeditious, but the Wound itſelf will alſo heal much ſooner, and with leſs Trouble to the Patient. Nor is it improper in this Caſe to paſs one or two of the Fingers into the Patient's Anus, as is uſual in cutting for the Stone: by which means the Inſtrument may be more exactly directed into the Bladder, without doing any Injury to the Rectum. Garengeot affirms, that no-body has wrote any thing concerning this Method: whereas it was propoſed by Riolan in a Suppreſſion of Urine, to perforate the Bladder when the Urine could not be extracted by paſſing a Catheter; and that this Perforation might be made either in the Hypogaſtrium, or in the Perinæum. In which latter he ſays the Knife is to be thruſt in laterally till it has reached the Bladder, and made Way for the Urine; by which

means he has freed many Patients from the moſt imminent Danger. See *Enchirid. Anat.* L. II. C. 30. The ſame Puncturation was alſo propoſed by THEVENOT, to be performed with a Knife till the Urine followed: beſides which it has been alſo propoſed in our own Time by MERIE and DIONIS. And I myſelf had (long before GARENGEOT) publiſhed a Chapter upon the Puncture of the Perinæum, in the firſt *German* Edition of my Surgery. M. CHIRAC has alſo propoſed this Method, as we are informed by MORAND: To whom we may add TOLET, who has, in his Lithotomy, recommended a triangular Bodkin for this Purpoſe, though without its Cannula, of which he afterwards gives us a Figure: with which Inſtrument, he ſays, the Bladder may be commodiouſly perforated in the hypogaſtric Region. But as the Cannula cannot be eaſily introduced after the Bodkin is extracted, it naturally follows, that introducing them together, the one in the other at the ſame Time, muſt be the beſt Method.

M. DENYS's Method, and Improvements.

V. The celebrated Lithotomiſt of *Leyden*, M. DENYS, has endeavoured to improve this Method of diſcharging the Urine out of the Bladder. He ſays, he has obſerved that the Surgeon is very often at a Loſs to know when his Trocar is really in the Bladder, upon which Account he may thruſt it in too far, ſo as to wound the poſterior Part of the Bladder, and endanger the Patient's Life. To avoid this Accident, he has contrived a Trocar of another kind, which is here repreſented from him in *Tab.* XXXI. *Fig.* 3, 4, 5. In the Tube, *Fig.* 3 and 4, there are three Apertures in the upper Part A A, (two of which only are conſpicuous in that Poſition) there are alſo as many Apertures in its lower Part B B, which are not conſpicuous in *Fig.* 3. being concealed by the Plate C C. But in *Fig.* 5, which repreſents the Bodkin out of its Cannula, we may obſerve that it is made round beyond the triangular Point: but from D D to the Beginning of its Handle E E it is triangular, conſiſting of three Sides, which are concave; which Sides of the Triangle D E ſhould correſpond with the Apertures in the Cannula, when the Bodkin is thruſt into it. By this means as ſoon as the Bodkin is thruſt into the Bladder, the Urine enters through the upper Apertures A A, and flows directly through the lower ones, giving ſpeedy Intelligence of the Inſtrument's having pierced the Bladder: after which the Bodkin is extracted, and the Urine diſcharged through the Cannula, which is left in the Wound. I remember TOLET ſays ſomething of a Trocar like this now deſcribed, the Cannula of which is perforated with two Apertures. See his Lithotomy, *Chap.* XXI.

A Method agreeable to the *Apparatus Major*.

VI. Some Authors, as TOLET and COLOT, propoſe another Method of puncturing the Perinæum, much in the Manner of the *Apparatus Major:* in which the Patient being rightly diſpoſed, a grooved Catheter is paſſed into the Urethra till it meets with the Obſtacle, which prevents its further Progreſs, being generally near the Neck of the Bladder. The Surgeon then makes an Inciſion in the Perinæum, cutting through the Urethra in the ſame Place, and in the ſame Manner as in the *Apparatus Major*, till the Point of its Knife has arrived into the Groove of his Catheter; but then he does not inlarge his Inciſion ſo much, as when he cuts for the Stone: and by this means he does as it were convert the Urethra of the male into a female one. Which done, he paſſes a Conductor or Gorgeret through the now-ſhort Urethra and Neck of the Bladder into its

its Cavity: into which he has no ſooner arrived, than the Urine makes a ſpeedy Exit, demonſtrating, at the ſame time, that the Inſtrument is in the Bladder. The Urine being thus diſcharged, a Silver Tube is conveyed through the Conductor into the Neck of the Bladder, where it is fixed, and ſecured by a Bandage, as before [a]. Both the Authors now mentioned affirm, that by dividing the Urethra ſo near the Neck of the Bladder, a plentiful Hæmorrhage follows, which abates the Inflammation and Tumor in the Sphincter and Neck of the Bladder to ſuch a Degree, that not only a Catheter, but a Cannula or Gorgeret may be alſo paſſed with more Eaſe into the Bladder: and COLOT reckons up a great Number of Patients, upon which he has performed this Operation for Ulcers and Excreſcences in the Bladder, as well as for a Suppreſſion of the Urine. However, in a Suppreſſion of Urine, I muſt needs think the Methods propoſed at § III. and IV. of this Chapter, to be more ſafe and eaſy, both for the Patient and Surgeon: becauſe the paſſing of Inſtruments through the contracted Neck of the Bladder muſt, in my Opinion, greatly increaſe the Pain and Symptoms of the Diſorder, which may be avoided by making a Paracenteſis in that Manner with a Trocar in the Bladder itſelf.

A fourth Method agreeable to the high Operation.

VII. Laſtly, There is ſtill another and moſt ready Method of performing this Operation according to the high Operation: in which the Trocar is paſſed into the anterior Part of the Bladder immediately above the Juncture of the *Oſſa Pubis*, where the Inciſion is made for the Stone in the high Operation. Here the Bodkin being extracted, and the Urine diſcharged by the Cannula, the latter is to be ſecured in the Wound by a Bandage faſtened round the Body, that the Urine may be retained or diſcharged at Pleaſure, till the Cauſe of the Suppreſſion be removed: after which the Wound may be healed by the *Balſ. Capiv.* covered with Lint and a Plaſter. Though this Operation is but ſeldom performed by Surgeons in a Suppreſſion of Urine, I muſt needs declare it my Opinion to be very neceſſary and convenient when nothing extraordinary forbids, ſince it is alſo recommended by ROSSETUS, RIOLAN, and TOLET; and ſince it appears from anatomical Experiments, that the Bladder may be thus ſafely perforated, when diſtended with Wind or Water, without incurring any dangerous Symptoms. And accordingly we find it has been put in Practice to good Purpoſe by TURBIER, MERIE, DOUGLAS, and MIDDLETON; which two laſt recommend this Method of perforating the Bladder, to be more ſafe and eaſy than that in the Perinæum. We have an Inſtance of the Succeſs of this Operation given us by WERLHOFF: but here the Surgeon did not uſe the triangular Bodkin or Trocar. He firſt divided the Integuments with a Scalpel, and then perforated the Bladder near its Neck with a large-ſized Lancet; after diſcharging the Urine, he introduced a Tube, and ſecured it in the Wound for nine Days. And thus the Patient was happily cured.

What is to be done after the Operation.

VIII. When the Cauſe of the Diſorder cannot be removed, in a Perſon advanced in Years; and when it proceeds from a Callous formed from ſome Fiſtu-

[a] SAVIARD, *Obſ.* 74. ſays this was his Method; only with this Difference, that, inſtead of the grooved Catheter, he uſes a ſtrait one, (as for Women) which occaſions leſs Pain to the Patient.

la

la in the Urethra, a Scirrhus of the proſtate, a large Stone, a Palſy of the Bladder, or ſome other obſtinate Malady: in ſuch Caſes the Patient ſhould conſtantly keep a Silver-pipe in his Bladder as long as he lives, made with a Valve and Screw to open and ſhut, that his Urine may not come away inceſſantly, but when the Patient deſires it. But when the Cauſe is only a ſmall Caruncle or Cicatrix in the Urethra, then the Surgeon ſhould endeavour to remove the Obſtacle after his Operation by the means intimated before in *Chap.* CXXXVIII. after which, when the Paſſage is cleared, the Wound may be healed up as we directed in Lithotomy. If the Suppreſſion proceeds from any Fungus, or foul Matter in the Bladder, they may frequently be removed by ſuppurating and deterging Injections[a]: but in ſuch a Caſe it is moſt adviſeable to perforate the Bladder, rather in its lower than upper Part. Laſtly, if a violent Inflammation has poſſeſſed the Neck of the Bladder, ſo as to obſtruct the natural Paſſage of the Urine, it will be neceſſary to bleed the Patient largely after the Operation, and then to adminiſter proper Glyſters and Cataplaſms, with cooling Medicines internally, in order to diſperſe the Inflammation and Tumor; which, if it be not effected before the third Day, the Patient ſeldom obtains a Cure.

IX. A Suppreſſion of Urine is ſometimes accompanied with a violent Inflammation of the Scrotum, which frequently turns to a large Abſceſs, or an incipient Mortification, of which COLOT has ſeveral remarkable Obſervations in *pag.* 236, 240, *& ſeq.* In which Caſes that Lithotomiſt adviſes firſt, to diſcharge the Urine by puncturing the Perinæum, or above the *Os Pubis*, and then to lay open the Scrotum down to the Teſticles, that no Blood or putrid Matter may be retained there; after which the injured Parts are to be treated with Balſamics, and Medicines proper in the like Caſes. During the Cure he retains a Silver Cannula in the Patient's Urethra, to prevent any Urine from eſcaping into the injured Parts, which might greatly increaſe the Diſorder. In Caſes where the whole Urethra is become callous and contracted, ſo as to deny any Admittance to a Catheter, he then makes an Inciſion through the Perinæum into the Urethra, and paſſes his Probe through the Neck of the Bladder into its Cavity; and the Urine being diſcharged, he lacerates the Callus, forms a large Suppuration, ſeparates the Callus, and reſtores the Parts to their former Diſpoſition (*pag.* 241, 245.) and if a Fiſtula ſhould remain behind *in Perinæo*, as ſometimes happens, he then removes its Calloſity by the actual Cautery. But after all, if this Method of Cure is not proſecuted in Time, but the Patient is much exhauſted, there is generally no great Proſpect of Succeſs: but all Endeavours prove of no Effect, as M. COLOT evinces by weighty Obſervations, *pag.* 350, *& ſeq.* Some Obſervations.

[a] COLOT enumerates many Inſtances of Cures in this way, *pag.* 235, 273, 277. See alſo TOLET. on Excreſcences of the Bladder in his Lithotomy, *pag.* 206.

CHAP.

CHAP. CXLV.

Of FISTULÆ *in* PERINÆO.

The Nature of theſe Fiſtulæ.

I. THESE Fiſtulæ are uſually the Conſequence of Lithotomy, or making a Puncture in the Perinæum and Bladder; or they may proceed from Abſceſſes in the Perinæum near the Urethra, as I have lately obſerved, or from a Scirrhoſity of the proſtate Gland; or even when the Patient is of an ill Habit, from a Wound or Ulcer, which can by no means be healed up; but its Lips becoming callous, forms a Fiſtulæ, through which the Urine is ſometimes preternaturally diſcharged, to the great Uneaſineſs of the Patient, being by the *Greeks* called ἐρεθυσδὰς, *Celſ. Lib. VII. Cap.* 26. *N.* 2. Sometimes theſe Fiſtulæ are formed from critical Abſceſſes in the Perinæum after malignant Diſeaſes, by which the *Membrana adipoſa* under the Skin, and about the Rectum, is ſometimes totally ſuppurated, the Urethra remaining entire. But theſe are not properly urinous Fiſtulæ, and they may be treated in the ſame Manner as we have before directed for Fiſtulæ in general. Thoſe Fiſtulæ which diſcharge Urine, are very often occaſioned by the Uſe of Tents or Pipes, which are retained longer in the divided Parts after Lithotomy, than is requiſite; or they may alſo proceed from a Stone which is very large and rough ſurfaced, in the Extraction of which the Parts are violently diſtended, contuſed, or lacerated; or, laſtly, from a Stone lodged in the Urethra, which by obſtructing and compreſſing the Parts in contact, cauſes a Suppuration and an Ulcer, eſpecially if the Patient is of an ill Habit.

Prognoſis.

II. The Treatment of this Fiſtulæ is various, according to the Patient's Habit, and the particular Diſpoſition of the Parts affected. For when the Fiſtula is very large, and has conſumed a great Part of the Urethra, the Patient being at the ſame Time of a bad Habit, it is with great Difficulty, if at all, that a Cure can be obtained; and the more difficult, as the Fiſtula is of a longer ſtanding, and more callous. On the contrary, when the Fiſtula is ſmall, with little or no Calloſity, the Patient being young, and of a good Habit, a Cure may then be obtained both with Eaſe and Expedition. But if the Diſorder is accompanied with a Scirrhoſity of the proſtate Gland, it never yields to a Cure, till that Scirrhoſity is firſt removed, which is generally a very difficult Taſk, as we learn by Experience. But if the Fiſtula be only external, and the Urethra untouched, it is attended with leſs Danger, and may be cured by the Method we laid down for Fiſtulæ in general. This laſt Kind is called ſimple, the other complicated.

Treatment.

III. There are three Methods of treating theſe Fiſtulæ. In the firſt Place, the Pipe, or Tent, or whatever elſe is contained in the Fiſtulæ, ſhould be immediately removed, and the Patient placed upon his Bed, or a Chair, in the ſame Manner as for Lithotomy; after which the callous Lips of the Fiſtulæ ſhould be cut off, and the Parts brought together by a ſticking Plaſter, after they have been dreſſed with ſome vulnerary Balſam: over the Plaſter ſhould be laid

laid a narrow Compreſs on each Side of the Wound, and the whole retained by a ſtrict Bandage. Which done, the Patient's Knees are to be tied together, and ſtrict Orders given to him to lie ſtill in Bed, that the Lips of the Wound may more eaſily unite with each other. For the firſt few Days after the Operation the Patient ſhould be allowed very little Drink, that he may not be often excited to make water: and the Dreſſings ſhould not be removed till the ſecond or third Day after the Operation, or till the Patient can contain his Urine. When the Wound is by this Means in ſome meaſure cloſed, the Patient may then be kept under the ſame Regimen with thoſe who have been cut for the Stone; and if he be a young Man, he may be allowed to walk about a little: by which Means, if the Fiſtulæ is not very malignant, he may obtain a perfect Cure. 2. The ſecond Method of treating theſe Fiſtulæ is, by removing their Calloſity with Cauſtics; and the Eſchar which they produce may be digeſted off with Baſilicon, or ſome other digeſtive Ointment: after which the Wound may be cloſed with ſome ſticking Plaſter, and proper Bandage, as before directed. As for the particular Cauſtic to be uſed in theſe Caſes, the moſt commendable are *Troch. de Min.* and *Lap. Infern.* or *Mercur. præcip. alb.* mixed with *Liniment. Arcæi:* or, laſtly, a piece of Bliſter-plaſter may be applied to the ſame Purpoſe, according to the Method of Mr. CHESELDEN, as we are told by DOUGLAS in the *Appendix* to his Hiſtory of the lateral Operation, *pag.* 19.

IV. It is to be obſerved, that the Cure of theſe Fiſtulæ in the Perinæum uſually comes on very ſlowly; eſpecially when they are large, and their Calloſity but imperfectly removed, either by the Knife or Cauſtic, and if the Patient at the ſame Time does not obſerve a proper Diet and Reſt of Body. If from theſe, or ſuch like Cauſes, the Fiſtulæ ſtill continues, and renews its Calloſity, it will be neceſſary to repeat the Inciſion or Application of the Cauſtic, till the Parts appear ſound. Sometimes theſe Fiſtulæ are beſt healed by ſtitching the Lips of the Wound together while they are bleeding, after the callous Parts have been cut off, or they may be retained by Compreſſes and Bandage; and when the Parts appear to be joined, the Stitches may be then extracted, and the Dreſſing renewed. Sometimes it is neceſſary to retain a Catheter in the Urethra and Bladder, that the Urine may be diſcharged thereby during the whole Cure: otherwiſe the Urine eſcaping through the Wound, will greatly impede its Agglutination. Laſtly, if the Fiſtula of the Perinæum is too narrow to admit of this Treatment with Conveniency, it ſhould be either dilated with prepared Spunge, or a piece of Gentian-root, or inlarged by the Inciſion-knife. A remarkable Inſtance of one of theſe Fiſtulæ being happily cured by this Method, chiefly by Suture, I ſhall communicate in the Obſervations which I intend ſhortly to publiſh. For a remarkable Cure of a complicated Fiſtula in the Perinæum from a Retention of Urine and a venereal Infection, I refer you to PETIT, *Mem. Chirurg. Pariſ. Tom.* I. *p.* 619. Further Treatment.

V. Hitherto we have deſcribed the four Methods of treating Fiſtulæ of the Perinæum: it ſtill remains for me to take notice briefly of a fifth uſed in treating this Diſorder, which is uſually called the *palliative Method.* To this Head belongs the Inſtrument deſcribed by NUCKE and SOLINGEN, and propoſed by WINSLOW: I mean the Yoke which we have deſcribed in *Chap.* CXXXVI. for an Incontinency of Urine, that, by compreſſing the Fiſtula with this Inſtrument, the Urine may not be continually diſcharged through it. And thus Palliative Cure.

the Diſorder may be in ſome meaſure mitigated, when a perfect Cure cannot be abſolutely obtained. But, to ſay the Truth, this Inſtrument is very often but of little Service to the Patient, as we learn from Experience, ſince it permits the Urine to eſcape thro' the Fiſtula.

An EXPLANATION *of the* THIRTY-SECOND PLATE.

Fig. 1. Repreſents a human Bladder taken from a male Subject: in the anterior Part of which may be ſeen various empty Tubercles, or Cells, which are diſtended by inflating the Bladder; in which Cells the Stone lies ſometimes concealed. AAAA ſhew the pyramidal Figure of the Bladder. B denotes the proſtate Gland inveſting the Neck of the Bladder, which is tied with a Thread near the Urethra. C is the hollow Cell on the right Side of the Bladder, which is larger than any of the reſt. D repreſents a leſs Cavity above the former. E ſhews a like Cavity on the left Side: another of which is at the *Fundus* of the Bladder marked F. *aaa* denote the Blood-veſſels which are diſtributed upon the Bladder.

Fig. 2. Repreſents a poſterior View of the ſame Bladder, being explicable by the ſame Letters: to which add GGGG Cells which are ſtill ſmaller, and not to be diſcerned on its anterior Part.

Fig. 3. Exhibits the Trocar of M. DENYS in its Silver Cannula; which differs from the common in its having three Apertures at the End of the Cannula, two of which only are viſible at AA, thro' which Apertures the Urine paſſes into its Cavity. B the triangular Point. CC the Plate of the Cannula perforated with two Openings. D the Handle of the Inſtrument.

Fig. 4. Repreſents the Cannula of the Trocar alone: in which AA denote the Apertures at the End of the Cannula in the preceding Figure. BB repreſent other correſponding Apertures through which the Urine flows after it has entered by the preceding; which Apertures are not to be ſeen in *Fig.* 3. being obſcured by the Plate CC.

Fig. 5. Exhibits the Bodkin out of its Cannula. DD, the Part of its Body immediately below the Point, which is made cylindrical to fit the Cannula: but the Part between DD and its Handle EE is triangular, and made a little concave on each Side, ſo as to give a Paſſage to the Urine: F its Handle. See more of this Inſtrument in *Chap.* CXLIV. § V.

Fig. 6. Repreſents a Stone of an uncommon Size and Figure, which I extracted without much Difficulty by the high Operation: it weighed about ℥ 4. The Reaſon of my repreſenting it in this Place is for the Conviction of thoſe who deny, that large Stones can be extracted by the high Operation. AA the Baſis of the Stone which lay near the Neck of the Bladder. B a ſmall Eminence of it which ſtuck in the Neck of the Urethra. C the upper Part which lay next the *Fundus* of the Bladder.

Fig. 7. Repreſents the Silver Catheter, which is ſtrait and hollow for Women, being of a particular Make different from that which we before exhibited in *Tab.* XXVII. *Fig.* 1. AA are two Rings near its Handle. B an Aperture in its Side near its Extremity, which is to be paſſed into the Bladder, oppoſite to which there is another ſimilar Opening. CCC a Groove in the convex Part

of

Fig. 1.

Fig. 6.

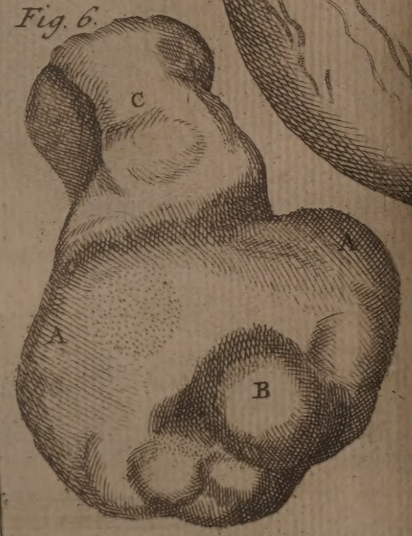


Fig. 3.

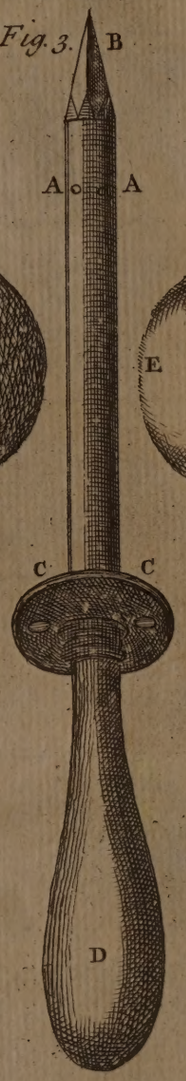


Fig. 2.

Fig. 5.

Fig. 4.

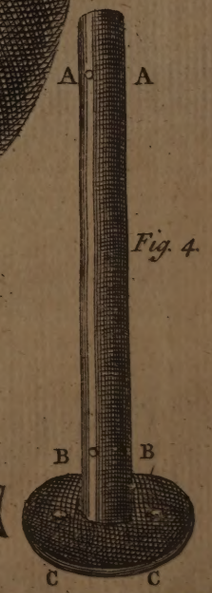
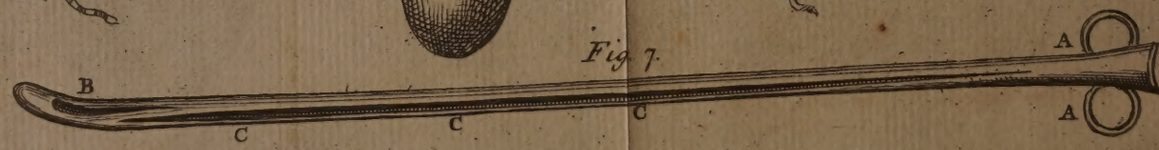


Fig. 7.



J. Mynde sc.

of the Catheter ſerving for various Uſes, and particularly for conducting the male Conductor into the Bladder, and for guiding the Knife when the Neck of the Bladder is to be divided, as in other grooved Catheters.

CHAP. CXLVI.

The Method of dividing præternatural Coheſions in the genital Parts of Women.

I. WE ſometimes meet with Girls, who have no Paſſage for the Diſcharge of their Urine, by reaſon of the Parts growing together whilſt they were in the Womb; which generally ſhews itſelf by the Infant's crying perpetually, without diſcharging any Urine for ſeveral Days after the Birth: in which Caſe ſhe muſt periſh if ſpeedy Relief be not had by the Knife; for it is impoſſible for the Infant to live without diſcharging its Urine. In others again we find the Urethra ſo ſmall, or the adjacent Parts ſo ſtrictly united, that the Urine cannot be diſcharged but by Drops[a], and that with the greateſt Difficulty. Sometimes the Mouth of the *Vagina*, or *Uterus*, is quite cloſed by the Membrane called *Hymen*; ſo that when they come to the Age of Puberty, their *Menſes* can have no Paſſage, nor the Huſband any Entrance, in conſequence of which follow violent Pains and Tumors in the Abdomen, with Frenzy and other bad Symptoms: which has occaſioned this Diſorder to be obſerved by ſeveral prudent Phyſicians[b], who have denominated thoſe who are thus affected *Atretæ*, or imperforated. *Ariſtotle*[c] appears to have been acquainted with this Diſorder, when he writes, that the "*Os Uteri* of ſome Women being cloſed or "grown together, when they come of Age, their *Menſes* finding no Paſſage, "excites Pain ſo as to occaſion a Rupture of the Parts by Nature, or a Diviſion "of them by the Hand of the Surgeon. Some of theſe die when the *Hymen* is "either opened by Violence, or remains impervious." We again meet with ſome Girls, who have the Mouth of their *Vagina* ſhut with a Membrane, which has a ſmall Aperture, and ſometimes more, like a Net, through which the *Menſes* find a Paſſage[d], but no Entrance is afforded for the Huſband: which Diſorder ſeldom makes itſelf known till Marriage. Kinds of the Diſorder.

II. This Diſorder differs in different Patients. In ſome there are the Remains of an urinary Paſſage, which alſo lead to the *Vagina* and *Uterus:* in others the *Vagina* is ſo grown together, that there is not the leaſt Appearance of any Paſſage; which is very difficultly, and indeed very rarely, cured. In others, again, the Urine is retained in the *Vagina*, where it is accumulated, Difference of the Diſorder.

[a] Such a Caſe is deſcribed by ROONHUYS *Lib.* II. *de Clauſura Uteri*, Obſ. 1. p. 114. Edit. *Amſtel.*

[b] Among whom are BENIVENIUS *Lib. de Abdit. Morbor. Cauſſ.* cap. 28. CABROLIUS *Obſerv. Anatom.* 23. FABRICIUS AB AQUAPENDENTE *in Oper. Chirurg.* Cap. *de Hymene imperforato.* HILDANUS *Cent.* III. *Obſ.* 60. SCHENCKIUS *Lib.* IV. *de Part. Genit.* SOLINGEN *in Obſ.* V. ROONHUYS *Obſ.* pag. 124. MEEKREN *Obſ. Chirurg.* 55. MAURICEAU *in Obſ. de Morb. Gravid.* 231, 495. RUYSCH *Obſ. Chirurg.* 32. SAVIARD *Obſ. Chir.* IV.

[c] *De Generatione Animal.* Lib. IV. Cap. IV.

[d] An Inſtance of this kind we have given us by HILDANUS in *Cen.* III. *Obſ.* 60.

and breaks forth immediately after the Birth; and in ſome Adults, who have no free Paſſage for the Urine, the menſtruous Blood greatly diſtends the *Labia pudendi*, by which means there is a Paſſage ſhewn both to the Urethra and Vagina. Sometimes this Diſorder happens in the Mother's Womb, and is therefore connate, as ARISTOTLE and CELSUS have obſerved. But it very often proceeds in Adults from an Exulceration in the Mouth of the Vagina, eſpecially after a difficult Birth, when the Parts are lacerated, violently inflamed or ulcerated ſo as make them grow together, leaving only a ſmall Aperture for the menſtruous Blood to diſcharge itſelf, but not ſufficient to give any Admittance to the Male[a]. Therefore, as in new-born Infants this Diſorder ſometimes obſtructs the Diſcharge of the Urine, and in Adults it intercepts (1.) the menſtruous Flux, (2). Coition, and conſequently Conception and Birth, it is highly neceſſary to provide a Cure for it.

Diagnoſis and Prognoſis.

III. Theſe Diſorders are diſcovered in new-born Infants by their diſcharging no Urine for ſeveral Days after the Birth, as alſo by the Sight and Touch[b]: but in Adults, where the Vagina is totally cloſed by a Membrane, the Diſorder diſcovers itſelf by violent Pains in the Loins, a Suppreſſion of the Menſes, Pain and Tumor of the Abdomen, Paleneſs in the Countenance, *&c.* but, above all, the Sight and Touch afford the ſureſt Indications. But in thoſe who have a ſmall Perforation in the Hymen, the Diſorder ſhews itſelf, not ſo much by obſtructing the Menſes, as the conjugal Intercourſes of the Huſband. With regard to the *Prognoſis* of this Diſorder, if the Membrane, which occludes the Mouth of the Vagina, is thin, and only a Continuation of the Hymen, it is generally broke open at the firſt conjugal Intercourſe: and if that has not the deſired Effect, a Paſſage may be eaſily made by an Inciſion-knife, with the Help of an expert Surgeon. Yet when the Coheſion of the Parts is very ſtrong and deep, the Cure muſt then be attended with ſome Difficulty, as the Thickneſs of the fleſhy Subſtance may make the Surgeon liable to wound the adjacent Rectum: which Accident ROONHUYS ingenuouſly confeſſes happened to himſelf. Nor is the Cure difficult upon that Account only, but alſo afterwards, from the great Stricture of the Parts, it will be equally difficult to dilate and keep them open, ſo as to recover their natural Dimenſions.

Obſtruction from a Membrane.

IV. In order to treat this Diſorder with Judgment and Succeſs, it is neceſſary for the Surgeon, firſt to have diligently conſidered its Nature and Diſpoſition, if there remains any Mark of the urinary Paſſage, and of the Entrance into the Vagina and Uterus, the Obſtruction being formed only by a thin Membrane, which ſhuts the Urethra, Vagina, or both, that may be commodiouſly divided by a cruciform Inciſion in the Form of the Letter *X*, as CELSUS adviſes. But if there remains a ſmall Aperture either in its upper or lower Part, it may be then divided with a Pair of Sciſſars, or with a Director and crooked Scalpel, being careful to avoid injuring the Urethra and Bladder: and, if it be thought

[a] Inſtances may be ſeen in the fore-cited Authors, and in PLATERI *Prax. Medic. Part* I. *Lib.* II. *Cap.* 17. BAUHINI *Anat. Lib.* I. *Cap.* 49. FORESTI *Obſ. Lib.* XXVIII. *Obſ.* 55. BECKERO *in Pædioctonia inculpat.* pag. 25, *&* *ſeq.* where he obſerves this Diſorder to have ariſen from an Ulceration after the Small-pox. K. NOLET *Obſ. Curieuſes, Obſ.* 13. *pag.* 46.

[b] I had once the Care of a Maid, who had all the mentioned Symptoms, and Marks of a ſtrict Coheſion of the Vagina near the Uterus; but by the Sight and Touch I could not find any Appearance thereof in fact.

proper, the whole Membrane may be in this Manner cut out. After which a Tent is to be ſpread with ſome digeſtive Ointment, and retained in the Part for a few Days by a proper Bandage: then another Tent may be ſpread with a deſiccative Ointment; ſuch as *de Ceruſſ.* or *Diapomphol.* and applied as before, 'till there is no Danger of another Coheſion in the Parts. But if the Vagina is cloſed by a very thick and fleſhy Membrane, or an Excreſcence ſo as totally to efface the Paſſage which leads to the Uterus, the Surgeon ſhould in that Caſe try to find a Paſſage with his Finger at the Bottom of it: which done, the Part is to be marked, and the Excreſcence removed by the Scalpel, as we before directed; only towards the latter End, when it is near being healed, a leaden Pipe, anointed with a cicatriſing Medicine, ſhould be introduced and retained in the Part till the Cure is compleated.

Obſtruction from a Stricture.

V. Sometimes the Paſſage of the Vagina to the Uterus is ſo contracted in new-married Women[a], either from an Ulcer, or other Accident, that the Huſband can find no Entrance, tho' the Menſes have at the ſame Time a pretty free Diſcharge: in which Caſe it may be adviſeable to make many ſmall Inciſions all round the Sides of the contracted Part, and then to make a Dilatation with a large Tent; as I did with Succeſs upon the Wife of a certain Taylor. After the Operation it will be proper to renew the Dreſſings twice every Day, except the firſt, to prevent the retained Matter from injuring the Parts, which may be gradually diſtended with Paſſaries made of Spunge prepared, or of dried Roots cut in a proper Shape: and, laſtly, a leaden Pipe, ſpread with ſome deſiccative Ointment, may be introduced and retained in the Parts till the Cure is compleated, as before. When the Orifice of the Vagina is not contracted from the Birth, but proceeds from ſome external Cauſe, it may be treated with Succeſs by the Method which we have now deſcribed, as I experienced upon the Wife of a Muſician. A Caſe of this kind may be ſeen in SAVIARD's *Obſ. Chirurg.* 32.

Of a particular Caſe.

VI. We have a very remarkable Example in CABROLIUS[b], of a Patient who was imperforated in this Manner at the Age of eighteen or twenty, her Urethra being alſo obſtructed by a thick Membrane, ſo that ſhe diſcharged all her Urine at the Navel, probably through the Urachus, which hung out like the Comb of an *Indian* Cock, for about four Fingers Breadth, affording an intolerable Smell of putrid Urine. To cure this Diſorder CABROLIUS firſt divided the thick Membrane to make way for the Urine, paſſing a leaden Pipe through his Inciſion down to the Bladder. The Day after, he proceeded to the Cure of the diſeaſed Navel, by making a ſtrong Ligature with waxed Thread upon the pendulous Part through which the Urine was diſcharged. Then he cut off the Part below the Ligature, as in the Operation for Ruptures, cauterizing the Part with a hot Iron, and after the Eſchar was removed, made a Cicatrization as in other Ulcers: and this he did in the ſpace of twelve Days, in which he made a perfect Cure of the Girl. And therefore the ſame Practice may be uſed when the like Caſe offers, omitting the Cauterization, as being too ſevere and terrifying to the Patient, and not neceſſary in the Operation.

[a] HILDANUS *Obſ.* 60, *& ſeq.* Cent III. SAVIARD *Obſ.* 32.
[b] *In Obſervat. Anatom.* XX.

CHAP.

CHAP. CXLVII.

The Method of opening the Vagina *when obstructed near the Womb.*

Nature of the Disorder.

I. BESIDES the forementioned Disorders which obstruct the Urethra, or Entrance of the Vagina, we sometimes meet with Cases, in which the Sides of the Vagina cohere, or its Cavity is obstructed near the Womb by some Membrane; which not only denies a Passage to the Menses, but also occasions an Accumulation of them, so as to cause acute Pains and Tumor in the lower Region of the Abdomen, together with Nausea, a wasting of the Habit, Restlessness, and the other bad Symptoms which usually precede Madness. Sometimes this Disorder is born with the Patient, and sometimes it is occasioned afterwards by external Causes, and especially a Laceration, Inflammation, or Ulceration [a] of the Vagina, frequently occasioned in difficult Births. Sometimes the Obstruction is near the Mouth of the Vagina, and sometimes near the Uterus, or betwixt both. Sometimes, again, the whole Vagina, or greatest Part of it is in this Manner closed and obstructed, or filled with a fleshy Substance: which is a very dangerous Case to undertake, because the Bladder or Rectum may easily be injured in the Operation. And though, in some of these Cases, there remains a Passage sufficient to discharge the Menses, yet they are incapable of the conjugal Offices; which has sometimes induced the married Couple to believe themselves bewitched, or to seek for a Divorce, when at the same Time the Disorder may be remedied by Art: and though a free Admittance is denied, some of them have been impregnated [b]. We have a merry Relation of a Girl that was imperforated after this Manner: who, when she became sensible that she could not be debauched by any one, enlisted a great many to her Service, particularly some stout Soldiers, who, upon Trial, were all disappointed in their Expectations, bilked of their Money, and derided by the Girl, who continued as much a Maid as ever. Some Time afterwards this Girl committed herself to the Care of a Surgeon, in order to be freed from the Impediment: the Cure succeeded so well, that, in a little Time afterwards he got her with Child, and she brought him Twins into the World, as a Testimony of his Skill, and a Reward for his Trouble.

Method of Cure.

II. With regard to the Cure of this Disorder, it generally succeeds without much Difficulty in young Girls, where the Membrane is thin, and not far from the Orifice of the Vagina, so that it may be commodiously incised. But in Adults that Operation is hardly practicable, unless when the Membrane is distended outward by the menstruous Blood: in which Case the Incision has been performed by BENIVENIUS, CABROLIUS, FABRICIUS AB AQUAPEND. ROONHUYS, SOLINGEN, MEEKREN, RUYSCH, (*Obs.* 32.) NABOTH, (*Dissert.*

[a] Thus BENIVENIUS has observed this Disorder from the same Cause in the Venereal Disease, *Lib. de abditis Morbor. causis*, cap. 31. and BECKERUS from the Small-pox.

[b] V. SOLINGEN Obs. de Mulier. Morb. 34. ROONHUYS lib. cit. *pag.* 127. and 130. MAURICEAU Obs. 489. RUYSCH Obs. 22. BOHNIUS in Circ. Anat. Progymn. I. COWPER in Phil. Transact. No. 237. *pag.* 56.

de

de Sterilit. § 4.) AMYAND[a], and others: who relate, that after the Incision followed a Discharge of thick Blood, and a fetid Liquor, by which means the Patient has been relieved from the most pressing Symptoms and imminent Death. In these Cases the Cure has been compleated by dilating the Parts after Incision with proper Tents and Pessaries of Wax, adding towards the latter End a leaden Pipe, in order to induce a Cicatrization of the Parts. But when the Vagina is obstructed by a very thick Membrane, or very near the Mouth of the Uterus, the Case is then much more difficult, but to be performed in the same Manner as before, though with a little more Caution, to avoid injuring the Rectum and Bladder. In this Disorder it may be sometimes necessary to use the *Speculum Uteri*, represented in *Tab.* XXXIV. *Fig.* 15. by which Means the Parts and their Disposition may be more exactly discerned, and the Incision more easily performed.

How managed in Women with Child.

III. If Women with Child, or near their Delivery, are thus afflicted, the Operation should be timely performed, lest it occasion a very difficult and dangerous Labour. The sooner the Incision is made before the Time of Delivery the better, otherwise when the Fœtus is large, there will be some Danger of wounding it. But when it is through Negligence or Ignorance deferred, till the Time of Birth is at hand, it is even then better to perform the Operation, than to neglect it, being careful not to wound the Fœtus. It is therefore adviseable to make at first but a small Incision in the Membrane sufficient to insert the obtuse pointed Knife, *Tab.* V. *Fig.* 4 and 5. to compleat the Separation of the Membrane: which may be also affected by a Director and Incision-knife, or a Pair of Scissars[b]. MAURICEAU[c] directs the Midwife in this Case to tear the Membrane with her Fingers: but it is much safer to divide the Parts by Incision, which is not attended with those bad Symptoms consequent on a Laceration.

Some necessary Observations.

IV. It is to be here observed, that when the Vagina is obstructed by a thick and fleshy Substance very near the Mouth of the Uterus, the Division cannot in that Case, be performed without much Difficulty and Danger: so that it is often more adviseable to relinquish, than undertake the Cure, as was formerly done by BENIVENIUS[d]. But even in those Cases, in which the Operation is not very dangerous, if the Parts are not kept open a considerable Time with proper Tents, Pessaries, or a leaden Pipe, they generally contract again, so as to give the Husband no Admission. And thus I have been obliged to repeat the Operation, and ROONHUYS has done the same. But when the Sides of the Vagina are strictly united near the Uterus, as I observed in the Wife of a certain Butcher, whose Disorder arose from a Difficulty in the Birth, the Operation is then extremely dangerous; so that I thought it better to refrain from the Operation, though I was strongly pressed to it both by the Husband and Wife, being desirous of Children. In some Cases, where there is a thick and fleshy Substance in the Orifice of the Vagina, it frequently becomes callous, or grows up again after Extirpation, if it is not kept down by the Application of

[a] Philos. Transact. N°. 422. In which Case the Vagina was so obstructed with Caruncles growing soon after Delivery, that not only the Passage of the Menses was obstructed, but also the Urethra compressed, so as to occasion a Suppression of the Urine.

[b] After the Method of RUYSCH *Obs.* 22. where the Case is illustrated with a Figure.

[c] Obs. de Gravid. *pag.* 489.

[d] Lib. de Abdit. Morb. Causis, *cap.* 31.

Caustics

Cauſtics and a leaden Pipe, till the Paſſage is ſufficiently large, and its Sides perfectly healed: otherwiſe the Vagina will eaſily cohere again, or become ſo much contracted as to render the Operation of no effect. For more on this Diſorder, the Reader may conſult ROONHUYS in *Lib.* II. of his *Chirurg. Obſ. de clauſis Vaginis*, as alſo BECKERUS in *Pædioctonia inculpata*, § XXVII. *& ſeq.* ROONHUYS alſo treats of the Method of opening the internal Mouth of the Uterus when thus cloſed, *l. c. pag.* 133, *& ſeq.*

CHAP. CXLVIII.

Of the Clitoris *growing too large.*

Hermaphrodites.

I. IN ſome Women the Clitoris grows to ſo large a Size, as to equal and reſemble the Penis of the male [a]: upon which Account ſuch Women have been called *Hermaphrodites*, notwithſtanding the Clitoris is without any Perforation, and does not diſcharge either Semen or Urine. As the monſtrous Size of this Part is a great Incumbrance to the conjugal Offices, the Surgeon's Aſſiſtance is therefore ſometimes deſired to remove the Impediment. This Diſorder is ſaid to have been frequent among the *Arabians* and *Egyptians*, inſomuch that it was a common Practice with them to cut off the Part, which indecently appeared externally in the new-born Infant. This, however, is an Operation ſeldom performed among the *Europeans:* becauſe Women, who have this Part larger than uſual, are deſirous of concealing it, either through Luſt, Modeſty, or a Dread of the Knife. But that the Surgeon may not be ignorant what to do in this Caſe, he ſhould obſerve that there are two Methods of proceeding. 1. Firſt, by making a Ligature upon the Part, and cutting off all below it, in the ſame Manner as we have before directed in removing Part of the Penis when mortified. 2*dly*, By cutting off the Part with an Inciſion-knife, according to ÆGINETA; and, after it has bled ſufficiently, by ſtopping the Hæmorrhage with Styptics and Bandage, performing the remainder of the Cure as in other Wounds. BALLONIUS relates, that the *Indians* remove the too great Length of this Part in their Women, by applying an actual Cautery.

CHAP. CXLIX.

The Method of treating the Nymphæ *when too much enlarged.*

THE Nymphæ in Women are ſometimes ſo large, as not only to hang without the *Labia pudendi*, but alſo to prove very troubleſome to them in walking, ſitting, and in their conjugal Embraces; and may therefore require the Surgeon's Aſſiſtance [b]. The Operator is therefore in the firſt Place to lay

[a] Inſtances of which we have in TULPIUS, DE GRAAF, PLATERUS, RHODIUS, PLAZONUS, PANAROLUS, PAULINUS, &c.

[b] See an Inſtance in SOLINGEN de Morb. Mulier. *Obſ.* 20. MAURICEAU *Obſ.* 174.

the

the Patient in a proper Poſture, and, taking hold of the Nymphæ with his left Hand, he is then to cut off ſo much of them with a Pair of Sciſſars in his right, as he ſhall judge neceſſary. But he muſt take care to have in Readineſs Styptics for the Hæmorrhage, and Medicines to prevent the Patient from fainting. When the Operation is over, the Wound may be dreſſed with ſome vulnerary Balſam, and healed without much Difficulty in the common Method. SOLINGEN gives us an Example, in which the Nymphæ were extirpated, after they had been ſeized with an incipient Mortification. *V. Obſ.* 80. *de Morb. Mulier.*

CHAP. CL.

The Method of removing Tubercles, Caruncles, and other Excreſcences in the Vagina.

I. WE ſometimes meet with Excreſcences of various Sizes and Figures, reſembling a Fig, Muſhroom, or Pear, infeſting both the external and internal Parts, and growing ſometimes to ſuch a Size, that they hang down to the Knees like the Clapper of a Bell, and prove exceeding troubleſome both in Bed, Walking, or Sitting: They often prove the Seat of violent Pains, and ſometimes of a Mortification, or Cancer, eſpecially when they are overgrown, and not timely removed: theſe are uſually called *Sarcomata* of the *Uterus*. CELSUS[a], and TULPIUS[b] call them by the ſimple Name of *Fungus*; but SOLINGEN[c] terms them *fici*, and ſometimes *cancerous:* but they are improperly and injudiciouſly termed cancerous, ſince they eaſily yield to a Cure; which is not in the Nature of that Diſorder. The nearer they are to the Mouth of the Vagina, the more eaſy it is to remove them, which is a very difficult Taſk when they lie deep; ſo that TULPIUS terms it a very uncommon Operation for a Surgeon to cut off Tumors of this kind. Some have falſly eſteemed them to be a *Prolapſus Uteri*, without any Manner of Reaſon, as I ſhall preſently demonſtrate. Nature of the Diſorders.

II. Theſe Diſorders may be treated in the ſame Method before propoſed for Tubercles and fleſhy Excreſcences in general, *Chap.* XXVII. removing them either by Ligature[d], the Knife, or Cauſtic Applications uſed either ſeparately or conjunctly: but Care ſhould be taken not to miſtake a *Prolapſus Uteri* for an Excreſcence of this kind. For the reſt, as Excreſcences in this Part are very difficult to be come at, like Polypuſes and Caruncles in the Noſe, it will be therefore neceſſary to make uſe of the Plyers or Forceps directed by FABRIC. AB AQUAPEND. and DIONIS, for extracting Polypuſes of the Noſe. See *Tab.* Treatment.

[a] Lib. VI. Cap. 18. N. 11.
[b] Obſ. Med. Lib. III. Cap. 33 and 34.
[c] Obſ. de Morb. Mulier. 29 and 56.
[d] An Example may be ſeen in MEEKREN, *Obſ. Chirurg.* Cap. 51. with a Figure of it. Sarcomas of the Uterus have been alſo lately removed by VATERUS, as he tells us in a Diſſertation on the Subject, by making a Ligature round the Root of the Tumor, and then extirpating it with the Knife, as I have alſo done myſelf.

XIX. with which Inſtrument the Excreſcence may be twiſted off. But before this Method be undertaken, it ought to be conſidered, whether the Patient can undergo the Operation, without being expoſed by it to greater Injuries. VOLTERUS, a *German* Surgeon, tells us, that he has, with Succeſs, extirpated many of theſe Excreſcences in the genital Parts of Women by a red-hot Inciſion-knife; which is a Practice in my Opinion rather to be abhorred than encouraged. SOLINGEN relates, that he happily extirpated a cancerous Excreſcence in the Vagina of a Woman, who recovered in a ſhort Time; but he does not tell us by what means he performed this Cure, nor does he inſtance the Reaſons which he had for calling it cancerous [a].

CHAP. CLI.

The Method of extracting the Stone in the Bladder of Women.

Women leſs ſubject to the Stone than Men.

I. WOMEN are not ſo often neceſſitated to undergo the Operation for the Stone as Men, becauſe they are not ſo ſubject to the Cauſes which produce it. For, in the firſt Place, they are more regular in their Diet. Then their urinary Paſſages are more lax, ſhort, and open; by which means the ſmall Stones, which are formed in their Kidneys, Ureters, and Bladder, are generally diſcharged before they are much increaſed, along with the Urine in its Paſſage through their ſhort and yielding Urethra; and even when they have been retained and enlarged in the Bladder for a conſiderable Time, their Urethra ſo eaſily dilates, that we are furniſhed with many Inſtances of pretty large Stones making their Eſcape without any Aſſiſtance from the Surgeon. Thus I had a Stone brought me weighing two Ounces, in Figure and Size like a ſmall Hen's Egg, but a little flatter [b], which was diſcharged from a Country-woman in the Neighbourhood, after ſhe had ſuffered the moſt excruciating Pains, like thoſe of Labour. Upon this Account it is a common Obſervation, that fifty of the male Sex are uſually cut for the Stone to one of the female: and MOLINEAU

[a] Vid. KERKRING. Spicileg. Anat. Obſ. 53. MEEKREN Obſ. Cap. 54. SOLINGEN Obſ. 29. N. 50. RUYSCH Obſ. 6. CELSUS Lib. VII. Cap. 30. N. 11.

[b] The Writers of Obſervations furniſh us with many remarkable Hiſtories of this Nature, and particularly BORELLI (Cent. II. Obſ. 22.) gives an Account of a Stone coming ſpontaneouſly from a Woman, which was as large as a Gooſe-egg. KERKRINGIUS (*Spicil. Anat. Obſ.* 67. *pag.* 163.) has obſerved one of above three Ounces Weight: and BARTHOLIN deſcribes a Stone thus diſcharged as big as a Hen's Egg, in *Hiſt. Anat. Cent.* I. *Hiſt.* 71. —— *In Miſcell. Nat. Cur. Dec.* I. *Ann.* VI, VII. *Obſ.* 7. we have an Account of a Stone thus diſcharged, weighing an Ounce and an half: and we have afterwards an Account of two other Stones weighing each two Ounces and an half, *Dec. ejuſd. An.* VIII. *Obſ.* 11. *pag.* 20. & *Dec.* II. *An.* II. *Obſ.* 180. and in *Dec.* III. we have more Inſtances; as we alſo have in DE GRAAF *de Mulier. Organ.* and in the *Philoſ. Tranſactions.* But more particularly remarkable are thoſe Stones, which were voided in great numbers for a long time running by a Woman of *Wolfenbuttle*; a Deſcription of which we have from D. HIERONYMUS, in a particular Diſſertation publiſhed *An.* 1711, who has ſhewn me ſeveral of them now in his Poſſeſſion, which weighed about two Ounces. Among others the Reader may alſo conſult TULPIUS *Obſ.* 5. *Lib.* 3. MEEKREN, and MIDDLETON *Hiſtory* XI. and COLOT *Lib. de Lithot.* pag. 289. which equalled a Gooſe-Egg, with many more Accounts of the ſame Nature in the Writers of *Obſervations.*

even reckons, that there is not above one Woman to be found among a hundred calculous Patients, which have undergone the Operation at *Paris*.

II. But notwithstanding Women have naturally this Advantage of discharging small Stones more easily than Men, yet they sometimes stand in need of the Surgeon's Assistance, when the Stone is retained in the Bladder from a Stricture of its Sphincter or Neck; till, having grown to a large Size, it occasions the most exquisite Pain, and other Symptoms, so as to render the Extraction of it absolutely necessary, when lithontriptic and diuretic Medicines prove of no effect. Extraction often necessary.

III. Another great Privilege enjoyed by the female Sex over the male is, that they may be generally freed from the largest Stones, barely by dilating the Neck of the Bladder and Urethra, without the dangerous Operation of cutting. It is even surprizing to what a Degree the Urethra and Neck of the Bladder may be dilated in Women, without incurring any great Damage: which is a Circumstance proved not only by the many Instances of very large Stones, being this way discharged without chirurgical Helps, but also by the numerous Testimonies of the most considerable Lithotomists, as HILDANUS, TOLET, GREENFIELD, ALGHISH, and others. We have a very remarkable Case published in *Miscell. Nat. Cur. Obs. Dec.* II. *An.* X. pag. 147. where the Woman was freed from a Stone weighing five Ounces and a half, barely by dilating the Urethra. Nor are the Cases less remarkable published in *Philos. Transact.* N. 202, 236, and elsewhere: though it must be confessed, that the Operation succeeds much better in young than old Patients. Incision often unnecessary in Women.

IV. The Case being thus, there are not so many Instruments required to extract the Stone from Women as from Men. However, there are more Methods contrived to extract the Stone from the former than from the latter; which may, for Distinction's sake, be divided like the Method of Lithotomy in Men, into the *Apparatus Minor & Major*, with the high and lateral Operation: each of which may be again performed by different Methods. We shall begin here with the first: which may be performed variously, according to the particular Circumstances of the Case. But before we enter upon this Subject, it will be necessary to consider what Method will be most convenient, since there are several. The most ancient of them described by CELSUS, is commonly termed the *Apparatus Minor*. The Method of extracting various.

V. The ancient Author of the *Apparatus Minor*, CELSUS [a], tells us, that when the Stone is small, the Use of the Knife is unnecessary; because it may be generally forced through the Neck of the Bladder with the Urine, or if it sticks by the Way, it may be extracted with a Hook [b]. But when the Stone is too large to be this Way extracted, the Surgeon is then to pass his Finger into the *Anus* or Vagina of the Patient, in order to press the Stone towards the left Side of the [c] Perinæum, and to cut upon it as in Males. This is agreeable to the Direction of ALBUCASIS, who advises to pass two Fingers in this Manner into the Patient's Anus, or Vagina, in order to find the Stone, and thrust it downwards towards Apparatus Minor.

[a] *Lib.* VII. *Cap.* 26. *N.* 4.

[b] By which means SAVIARD extracted a Stone from a Girl, *Obs.* 86.

[c] Some of the Moderns advise to press upon the Abdomen and Bladder with the right Hand, whilst the left is searching *in Ano*.

the left Side of the Anus, or Tubercle of the Iſchium; that, being felt by the Fingers externally in the Perinæum, an Inciſion may then be made down to the Stone, without injuring the Bladder, and the Stone appearing is to be thruſt out by the Fingers *in Ano*, or extracted as in Men. MEEKREN alſo uſes this Method of paſſing his two Fingers into the Vagina, to expel the Stone when it ſticks in the Urethra; by which means, with the Aſſiſtance of a Hook, he ſeldom fails in his Intention. This Method has been alſo generally received; only with this Difference, that ſome firſt of all dilate the Urethra with Inſtruments[a]: others divide it according to Neceſſity, and then extract the Stone with a Hook, or Pair of Forceps, when it cannot be preſſed out by the Fingers only. But then the Operation in my Opinion ought to be referred to the *Apparatus Major*. The celebrated *Engliſh* Surgeon Mr. JOHN DOUGLAS has propoſed a new Method for the Extraction of a ſmall Stone, agreeing with the *Apparatus Minor*, by which the Urethra is to be gradually dilated with Tents made of Gentian Root, or prepared Spunge, till the Capacity is ſufficient to admit the Forceps for extracting the Stone[b]. The Exiſtence of the Stone in female Patients may be known by the Symptoms which it occaſions, and by ſearching with the Catheter and Finger[c], as we before propoſed for the *Apparatus Minor* and *Major* in Males. The Woman is to be alſo ſecured in the ſame Poſture, and the *Labia Pudendi* with the *Nymphæ* are to be held aſunder by the Aſſiſtant, whoſe Office was to hold up the Scrotum in the male, that the Lithotomiſt may have a clear View of the Parts below the *Clitoris*. See *Tab.* XXIX. *Fig.* 2. *Lit.* D. Which, being rightly performed, the Surgeon may proceed to his Operation by the Method which ſhall appear to him to be the moſt convenient. When one Stone is extracted, he ſhould then ſearch for more, if any, and extract them in the ſame Manner. But there will be ſeldom any Occaſion for binding the Patient in this Method, eſpecially when the Stone is ſmall, and the Extraction of it may be made by placing the Patient a-croſs a Bed.

Apparatus Major.

VI. There is another Method of extracting the Stone from Women, which agrees with the *Apparatus Major* uſed for Men, and may be therefore termed the *Apparatus Major* for Women; ſince it requires more Inſtruments for performing it, which are not very different from thoſe uſed in the ſame Method for Men. But there are ſeveral Ways of proceeding, as well in this as in the preceding Method: but the following is moſtly uſed among the Moderns. The Woman being diſpoſed upon a Table, like the Male for the *Apparatus Major*, and lateral Operation, being ſecured by Aſſiſtants, and the *Labia Pudendi* and *Nymphæ* held open as before, the Operator proceeds to paſs a male and then a female Conductor, *Tab.* XXVIII. *Fig.* 2 and 3, thro' the ſhort Urethra into the Bladder, according to the Directions given for the *Apparatus Major* in *Chap.* CXL. In the next Place, the Surgeon gradually dilates the Neck of the Bladder and Urethra, by opening the Conductors. See *Tab.* XXIX. *Fig.* 2. B. C. Then he paſſes his Finger, and after that a Pair of Stone Forceps, *Tab.* XXVIII.

[a] As TOLET adviſes in his Lithotomy, *Chap.* XV. But HILDANUS thinks this Method dangerous, and apt to be attended with an Incontinency of Urine.

[b] When the Stone is too large to be thus extracted, Mr. DOUGLAS adviſes to cut for it by the high Operation. See his *Lithotomy* Edit. 2. pag. 55. and *Philoſ. Tranſact.* N°. 399.

[c] The Size of the Stone may be beſt judged of by the Finger.

Fig.

Fig. 5. between the two Conductors into the Bladder, and by them ſtill further dilates by Degrees the Neck of the Bladder ſufficient to admit a Paſſage for the Stone; which is to be extracted with the Forceps, as we before directed in Men [a]. This may be generally done without much Difficulty, when the Stone is ſmall, ſmooth-ſurfaced, or of a moderate Size. But when it is large, the Taſk is harder: however, the Urethra is then alſo to be gradually dilated till the Stone follows. When the Stone cannot be readily found with the Forceps in Women, the two Fore-fingers of the left Hand may be paſſed into the Vagina, and the Stone thereby thruſt into the Mouth of the Forceps: but in Girls it may be ſufficient to paſs one Finger only into the Anus. But if, after all, the Stone proves too large to be thus extracted, the Operator ſhould then uſe a pair of ſtronger Forceps made with large Teeth, repreſented in *Tab.* XXVIII. *Fig.* 7. and endeavour to break the Stone, that it may be extracted in pieces. But if the Stone is too hard to be broke, or if we are deſirous to extract it whole, it will then be neceſſary to divide the Urethra, either in one or both Sides. If there be Occaſion, he may, in my Opinion, venture to divide ſome Part of the Neck and Body of the Bladder itſelf, ſince that may be ſafely done in Men in the lateral Operation, as we are aſſured by the Inſtances of Raw, Cheselden, Le Dran, and others. Hildanus [b] indeed thinks it dangerous to divide the Neck of the Bladder; but we are ſatisfied it was only from the prejudiced Notion then entertained by the Ancients after Hippocrates. And Parey [c] ſeems to approve of this Operation, ſince he has recommended and repreſented a particular kind of grooved Catheter for dividing the Urethra in Women when there is occaſion: which Inſtrument is alſo approved by Colot, and agrees with that repreſented by us in *Tab.* XXXII. *Fig.* 7. Some Lithotomiſts uſe a cannulated Conductor, through which they paſs the Forceps into the Bladder as in Men. To prevent an Incontinency of Urine from the great Diſtenſion of the Parts, it may be ſerviceable to apply an aſtringent Fomentation for a few Days; though this is an Accident which does not ſo often happen in young, as in old Patients: yet, if the Parts are wounded, it will be alſo neceſſary to treat them with vulnerary Medicines.

VII. Marianus thinks it moſt adviſeable to leave the Expulſion of ſmall Stones to Nature, as the Urethra in Women is very ſhort and lax: but if the Stone is very large, he thinks it will be neceſſary to extract it by the Method propoſed for Men. But the Place to be inciſed, he ſays, is in Women between the *Os femoris* and Urethra: ſo that when the grooved Catheter is in the Bladder, the Operator is to thruſt the End of it outward towards the Perinæum, in order to cut upon it as we before directed. In the mean Time an Aſſiſtant is to hold the *Labia Pudendi* and *Nymphæ* on the left Side towards the right, that the Operator may have a diſtinct View of the Part to be inciſed; which he then proceeds to divide about a Finger's breadth from the Thigh, making his Inciſion and Extraction in the ſame Manner, and with the

Some Variations.

[a] This is the Method deſcribed by Tolet (*Cap.* XV.) Saviard (*Obſ. Chirurg.* 72.) and Garengeot without mentioning any other way; though it is certain, that the *Apparatus Minor* may be uſed, when this here deſcribed is not ſo convenient.

[b] Lib. *de Lithot.* Cap. XXII.

[c] Lib. XVI. Cap. 47.

ſame Inſtruments as in Men. Nor ſhould the Surgeon be terrified, ſays MARIANUS, if the Operation be attended with a more copious Hæmorrhage in Women than Men [a]. Though the particular Part to be inciſed is not ſo diſtinctly pointed out by MARIANUS, as we could wiſh; I am apt to think that he meant the ſame Place in which JAMES and RAW made their Inciſions in Women. Some Operators uſe a peculiar Inſtrument commonly called a *Dilatator*, in order to open the Parts; which Inſtrument they paſs between the two Conductors, in order to dilate the Neck of the Bladder before they introduce the Forceps and extract the Stone. For my own Part, I uſually thruſt my Fore-finger, inſtead of the forementioned Inſtrument, between the two Conductors, and paſs the ſame into the Bladder, as I before obſerved in the *Apparatus Major*, in order to make Way for the Forceps: by which Method the ſaid *Dilatator* may be omitted, and the Neck of the Bladder more gradually and gently dilated. Some Lithotomiſts [b] rather adviſe to inlarge the Urethra by Inciſion, or even to cut into the Body of the Bladder itſelf, than to contuſe and lacerate the Parts by a too violent Diſtenſion, which will be attended with many bad Symptoms that may be avoided by Inciſion. Others [c] again affirm, that there is never any Occaſion to divide the Parts by the Knife; which they ſay will be attended with worſe Symptoms than a bare Dilatation: in favour of which Opinion they alledge the Inſtances of large Stones being diſcharged by Nature without any Inciſion; and by Art, only making a Dilatation. This Opinion is much countenanced by MOLINEAU of *Dublin*, (*Phil. Tranſact.* N°. 202.) and in Part confirmed by Caſes which he enumerates, and particularly a Girl of ſix Years old, whoſe Urethra was ſo largely dilated by M. PROBY of the ſame City, by means of a *Speculum Veſicæ*, that he afterwards introduced the Forceps, and extracted the Stones with Eaſe. He reports the ſame alſo of two adult Women, and gives us the Figures of the Stones extracted; concluding, that if the Urethra may be thus dilated in young Subjects, it may be much more ſo in thoſe who are adult, ſo as to make it altogether unneceſſary to wound the Urethra or Bladder. But it is to be obſerved, that the Stones thus extracted were all of them but ſmall, the largeſt of them hardly exceeding the Size of a Pidgeon's Egg: and I readily grant, that much larger than them may be this way extracted. But Stones of all Sizes cannot be thus taken from the Bladder, as Mr. WOOD [d] affirms, and proves by a Caſe of a Woman whom he happily cut, and freed from a Stone weighing ℥ ix, which he reaſonably aſſerts to have been impoſſible to extract barely by Dilatation. Therefore the Method of extracting Stones from Women ought to be prudently varied, and managed according to their Size, Figure, and other Circumſtances. Some paſs a grooved Catheter into the Bladder before the male Conductor, that the Point of the latter may paſs in through the Groove of the former. See (*Tab.* XXXII.) after which they introduce the other Inſtruments through the Cavity of the Male Conductor.

[a] Which has been alſo adviſed by CELSUS Lib. 7, Cap. 26. N. 4. And at N. 5. he ſays, that the Blood ought not to be directly ſtopped in robuſt Patients, to prevent any Inflammation of the Parts.

[b] As ROSA and SCHAFFERUS in Diſſert. *de Calc. Argentorat.*

[c] LAVATERUS Diſſert. *de Calc.* pag. 231.

[d] *Philoſ. Tranſact.* N. 209.

VIII. Frere

VIII. Frere Jacques uſually cut Women in the ſame Manner as he did Men. But I do not know that his Method was followed by any but Raw[a]; the Generality of Lithotomiſts having adhered to the preceding Method, and rejected the lateral Method for its Danger and Difficulty[b]. But I muſt declare it as my Opinion, that both of thoſe Methods may be practicable to the Advantage of the Patient, whenever the Stone is found to be too large to paſs the Urethra without greatly injuring the Neck of the Bladder. Nor is there any Danger of weakening the Neck of the Bladder by cutting according to James's Method, provided the Operator is cautious not to wound the Rectum, or Vagina, which was generally the raſh Practice of James. Indeed thoſe Accidents may be eaſily committed, as appears from the Obſervation of Sermesius, who, upon opening many female Subjects that had been cut by the lateral Method, eſpecially Girls and Maids, found the Vagina entire: but in all that had borne Children, the Vagina was wounded, which is a Circumſtance that I myſelf have frequently obſerved in dead Subjects. Falconet alſo declares, that there is much more Caution required to perform the lateral, than any other Method of Lithotomy in Women: and therefore he thinks it moſt adviſeable to cut by the high Operation, when the Stone is too large to be extracted through the Neck of the Bladder. Otherwiſe, he approves of dividing the Vagina with the Bladder and its Sphincter by cutting in the Groove of a Catheter, which Inciſion is better performed upon the Stone itſelf thruſt towards the Neck of the Bladder, according to the Opinion of Bussiere[c]. Sharpe alſo ſeems to agree with this Opinion. Not much differing from the preceding is the Method propoſed for Women by Merie; who, in order to prevent the Neck of the Bladder from being contuſed or lacerated by a too violent Dilatation, which would cauſe an Incontinency of Urine, adviſes to paſs a grooved Catheter into the Bladder, and to cut through the Sphincter-veſicle, together with the contiguous Part of the Vagina[d] as in Males: by which means the Stone may be extracted without dilating, contuſing, or lacerating the Neck of the Bladder, only by dividing it, which is not attended with the malignant Symptoms of the former, but heals up in a ſhort Time. For we find that it was an Obſervation, and even a Rule with Phyſicians in the Time of Celsus, that inciſed Wounds were leſs dangerous, and more ſpeedily to be cured, than thoſe which were contuſed or lacerated. And therefore it is the leſs ſurpriſing that Hildanus ſhould have freed a Woman from a Stone as big as a Hen's Egg, by cutting almoſt in the ſame Method through the Vagina, and Part of the Bladder; dilating the Wound partly with his Finger, and partly with the Knife down to the Neck of the Bladder, ſufficient for the Extraction of the Stone by the Forceps: and thus he made a per-

By the lateral Method.

[a] Oratione *de Methodo Anatomiam docendi*, pag. 37. where he mentions one Girl among the vaſt Number of Males he had cured.

[b] Indeed M. Denys recommends the Method of Raw for Women (*Obſ. de Calc.* Cap. X.) but does not give us any Inſtance of himſelf having performed it; and though Raw tells us he performed it on a Girl of four Years old at *Leyden*; yet I cannot learn, that it has been undertaken by any of the *French* or *Engliſh* Surgeons.

[c] *Phil. Tranſ. Abr.* Vol. III. pag. 185, & ſeq.

[d] This Practice was deſcribed before Merie by Dr. Lister in his Journey to *Paris*, pag. 237, where he ſays, Women are moſt eaſily cut by paſſing the Scalpel through the Vagina into the Bladder.

fect

fect Cure of the Patient. See *Cent.* I. *Obſ.* 68. *Cent.* III. *Obſ.* 69. where he relates the Caſe of an Ulcer perforating the Bladder and Vagina, through which many Stones were diſcharged: the Parts healing afterwards, ſhew Wounds therein to be curable.

Douglas's Method by the high Operation.

IX. We have another Method propoſed by Douglas, when the Stone is too large to be extracted through the Neck of the Bladder, by dilating it with a Tent of Gentian Root, or prepared Spunge, ſufficient to admit the Forceps, as we obſerved § V. In this Caſe Mr. Douglas approves of cutting by the high Operation; that is, by diſtending the Bladder with warm Water, and compreſſing the Urethra, by inſerting the Finger in the Vagina, after which an Inciſion is made into the Bladder immediately above the *Os Pubis*, as we before directed for the high Operation in males. I muſt needs approve of this Method when the Stone is very large, and the Patient young and healthy, (whoſe Wounds heal eaſily) becauſe in this Way there is no Danger of wounding or weakening the Sphincter of the Bladder, ſo as to bring an Incontinency of Urine. But for ſmall Stones I prefer the *Apparatus Major* and *Minor* propoſed in this Chapter, as being leſs dangerous. Of which Opinion we alſo find Morand, who ſays, that when the Stone is ſmall in Women, it may be extracted by dilating in the common Method: but if it be large, the Patient ſhould be cut by the high Operation, to avoid an Incontinency of *Urine*, which is otherwiſe a very frequent and troubleſome Symptom.

The Stone formed on Bodies thruſt into the Bladder in Women.

X. It is to be obſerved, that Stones in Women are ſometimes formed, not ſpontaneouſly, but by an Incruſtation of large Needles, or the Bodkins which they uſe in their Hair, or ſuch like Bodies, ſlipping into the Bladder, in puſhing back a Stone from its Neck; or perhaps thruſt into thoſe Parts with a laſcivious Deſign. For whenever there are any foreign Bodies of that kind in the Bladder, the earthy and tartarous Parts of the Urine adhere to their Surface, and in Time form very large Stones. Inſtances of this kind we have ſeveral given us by Molinet, Alghish, Greenfield, Cheselden, and others. But the moſt ſurpriſing of all is that in the *Philoſophical Tranſactions*, N°. 260, of a Girl about twenty Years old, from whom Mr. Proby extracted the Stone by the high Operation without diſtending the Bladder, the Baſis of which Stone was a Hair-pin, which had been ſwallowed, and made its way into the Bladder. But I am apt to believe, that that Pin, which was about the Length of ſix Fingers Breadth, and proportionably thick, could not eaſily be ſwallowed, nor make its way through the Stomach into the Bladder: I rather believe that it was puſhed through the Urethra, with a laſcivious Deſign by the Girl, who, according to that Author, was of a warm and ſanguine Habit. It is remarkable, that this Inſtance of cutting by the high Operation with Succeſs, was not obſerved or mentioned by any of the *Engliſh* or *French* Lithotomiſts, who have writ upon that Method; notwithſtanding it is one of the greateſt Arguments in Favour of the Operation, which they endeavour to recommend: and therefore one would imagine the Caſe had ſlipt their Notice [a].

[a] In the *Philoſophical Tranſactions* N°. 168. Dr. Lister gives an Account of a Lad cut by Colot, the Baſis of whoſe Stone was found to be a Needle, which he had thruſt into his Bladder about two Years before. To which I may add, that my Son ſaw Senffius (at *Berlin* in 1735) extract a Stone from a Man, in which was found a Spike or Beard of Barley: but by what means it came there, neither the Patient nor any body elſe could imagine.

CHAP.

OF MIDWIFERY.

CHAP. CXLII.

The Method of treating difficult Births, the Fœtus being alive.

I. HARD Labour is, when the Mother is not delivered in the ſhort and uſual Time of about the Space of an Hour[a], the Excluſion of the Fœtus being impeded by various Cauſes, which render the Birth impracticable, without ſome Aſſiſtance from the Hand of the Midwife. This is by the *Greeks* called Δυστοκιὰ. The primary Cauſes of a difficult Labour are either in the Mother, the Midwife, the Fœtus, or the Membranes that incloſe it. And (1.) in the Mother the Cauſe may be a bad Conformation of the Parts, particularly the Bones of the *Pelvis*, with the *Os ſacrum* and *Coccyx*, as in crooked Women; by which means the Capacity of the *Pelvis* is too narrow to exclude the Fœtus in the natural Way, or even to admit the Hand of the Midwife to its Aſſiſtance. As likewiſe if the Mother be a Dwarf, or very low of Stature, the Labour is generally exceeding difficult. And it goes hard for the moſt part with hump-backed Patients, and particularly thoſe, whoſe Wombs are obliquely ſituated, inclined either to one Side, or forward or backward. Another Cauſe may be the Age of the Patient, being either too young or too old, or being too tender and timorous: Or ſhe may be of a melancholic Diſpoſition, throw herſelf into Deſpair, and check the Efforts of Nature; or untractable and obſtinate, and not aſſiſt her Labour-pains by ſtraining. I have ſeen Inſtances of ſome, who, when their Poſture was advantageous and Circumſtances favourable, have ſtarted up on a ſudden, like mad Women, and diſappointed the Labour. If, laſtly, the *Vagina Uteri*, the *Hymen*, or other Membrane, be cloſed, if there be a Swelling, Excreſcency, or Callous in the Vagina, the Paſſage may be ſo obſtructed as to hinder the Excluſion of the Fœtus, or even the Admiſſion of the Hand. And too great a Fulneſs of Blood, or long-retained and indurated Fæces may be likewiſe numbered among the Cauſes of a difficult Labour on the Mother's Side.

Obſervations previous to the Art of Midwifery.

Cauſe of difficult Birth in the Mother.

II. The Birth may be rendered difficult by the Midwife's Fault, if ſhe endeavours to force it prematurely on account of falſe Pains or for other idle Reaſons, while the *Os Uteri* is yet cloſed: for thus the Patient's Strength is unſeaſonably exhauſted. The ſame will happen, if ſhe breaks the Membranes of the Fœtus too ſoon, and diſcharges the Waters before their proper Time, which are abſolutely neceſſary to a ſucceſsful Birth. Likewiſe, if ſhe is ſo ignorant, as not to correct trivial Errors, which are eaſily corrected: for Inſtance, if the Fœtus ſhould preſent one or both Feet, and, inſtead of extracting them, ſhe returns

In the Midwife.

[a] It is not the Buſineſs of this Place to explain the Nature and Cauſes of natural Births; for that Doctrine, I ſuppoſe, the Reader may be acquainted with from Anatomy and Phyſiology.

them into the Womb; in these and the like Cases, she will not only render the Birth very difficult, but often destroy both the Mother and Child.

In the Fœtus or ts Membranes.

III. The Cause may be in the Fœtus, when it is over-sized, or has too large a Head; (such are Infants which have watery Heads, two Heads or two Bodies, or are in any way monstrous or preternatural Productions) or if it die before, or at the Time of Delivery; in which Case the Birth is generally more difficult than when it is living and active, and by that Activity excites, stimulates and assists the Pains of the Mother. Likewise, if the Fœtus, whether dead or alive, presents itself in an irregular and unnatural Posture; many Instances of which we have given in Plate XXXIII. *Fig.* 4 to 12. And many more may be seen in the several Writers on Midwifery, by which the Birth is frequently rendered difficult, and sometimes quite impracticable. Lastly, when the Membranes of the Fœtus are so thin that they burst too soon, and discharge the Waters prematurely; hence arises, what they call a difficult and dry Birth. Or if these Membranes are so tough and obstinate, as to retain the Waters beyond their proper Time, they often check and retard the Exclusion of the Fœtus.

What the Physician should do.

IV. When several of these Causes concur, the Delivery is so much the more difficult. Whenever a Physician, Surgeon, or Midwife is called to a Woman in her Labour-Pains, their first Business is to enquire, whether the Birth is mature, or the Woman gone her full Time of nine Months; and, whether the Swelling of the Belly is perceived outwardly to have descended, which indicates the turning of the Fœtus towards the Birth: In the next Place, they should see if there flows from the Parts a Kind of mucous Humour streaked with Blood; and, lastly, examine whether the *Os Uteri* is relaxed or closed. For when that Time is not expired, and no other Labour-pains[a] are felt, the Infant presenting itself, and the *Os Uteri* not being relaxed, in that Case both the Application of the Hand, and Medicines which promote the Birth, ought to be carefully avoided. Care should rather be taken to dispose the Patient to rest in a warm Bed, and to endeavour to remove the false Pains by a prudent Exhibition of proper Medicines internally, with the Application of discutient and strengthening Cataplasms and *Sacculi*; by which Means the Patient frequently goes her proper Time. It is to be wished, the Fault of exciting immature Births by Medicines, was not so common as we generally find it, by which unskilful Treatment, Death is too frequently brought on. But if the Woman has gone her nine Months from the Time of Conception, and her true Labour-pains appear, which may be known by their proceeding from their Loins downward towards the *Pubes*, the Limbs at the same Time trembling, and attended with an urging Tenesmus and Relaxation of the *Os Uteri*, the Method of examining which, see *Tab.* XXXIII. *Fig.* 1. In that Case the Woman should be put to Bed, and use all her Endeavours to promote the Delivery, or she may be

[a] Labour-pains are usually distinguished into *true* and *false*, or spurious; the true are those which come upon a Woman at or near the End of her full Time, and, beginning at the Loins, proceed downward to each Inguen, and to the Parts of Generation: the false, or spurious, are those perceived in the upper and middle Part of the Abdomen, like a Cholic, arising from Wind, or Indigestion, and are no Sign of Delivery. The true Pains are also distinguishable from the spurious, by the *Os Uteri* dilating or relaxing itself in the first, but continuing contracted or closed in the last.

placed

placed in a Chair contrived for that Purpoſe; and if her Delivery does not ſucceed, notwithſtanding the Relaxation of the *Os Uteri*, it may then be neceſſary to uſe other proper Means, which we ſhall preſently deſcribe.

V. But, firſt, it may not be amiſs to obſerve, that it is cuſtomary with the *French*, and ſeveral other Nations, to deliver their Women upon the Bed; but in *Germany* that Buſineſs is uſually performed ſitting in a Kind of Chair for that Purpoſe, repreſented in *Tab.* XXXIII. *Fig.* 14. which laſt Method is, in my Opinion, much preferable on ſeveral Accounts. And firſt, becauſe they can better exert their Strength, by fixing their Feet upon the Ground, and their Back againſt the Chair A, their Thighs upon the Croſs board C, which has a ſemicircular Piece cut out of it; that the *Os coccyx* may have room to bend back, the Patient at the ſame Time holding the two Handles DD faſt in her Hands: and thus the Patient can not only exert her Strength to more Advantage, but alſo the Midwife and her Aſſiſtants can have better Acceſs to perform their Office. In Places where one of thoſe Chairs are not to be had, two common Chairs of the ſame Height may be placed together, about ſix or eight Inches diſtance from each other, and tied faſt in that Poſition, that the Patient may ſit with a Thigh upon each Chair, and her Genitals hanging over the intermediate Space betwixt them; by which means the *Os ſacrum* and *coccyx* have their free Liberty to recede at the Time of excluding the Fœtus. Among the Country-Folks, and meaner Sort of People in *Germany*, it is ſometimes cuſtomary for the Huſband, or a ſtrong Woman, to ſit down in a common Chair, taking the Patient upon her Thighs, and holding her in their Arms, perform the Office of the Laying-Chair. The Situation of the Patient.

VI. But it is previouſly neceſſary for the Surgeon or Midwife to have had an Idea of the Form and Situation of the *Os Uteri*, either from Anatomy or Anatomical Figures of the Part which is repreſented in *Tab.* XXIX. *Fig.* 2. L. or *Tab.* XXXIII. *Fig.* 1. C. and in the next Place they are to obſerve that this *Os Tincæ*, or *Uteri*, is in pregnant Women ſo ſtrictly cloſed, except at the Time of Delivery, that it will ſcarce admit the End of the leaſt Finger: in which State it continues till the true Time of Delivery approaches. When none of the true Labour-pains are felt, this Part continues ſhut: but if the Pains are genuine, it gradually dilates itſelf ſufficient to admit ſeveral of the Fingers, the inveſting Membranes of the Fœtus at the ſame Time protruding through the opening like a Bladder diſtended with Water, in which ſome Part of the Fœtus may be frequently perceived by the Fingers; which is therefore a certain Sign of a ſpeedy Delivery, and the more ſo, as the *Os Uteri* is more dilated. But, in order to examine the State of the *Os Uteri*, it will be neceſſary for the Surgeon or Midwife to paſs their Middle-finger dipt in Oil into the Patient's Vagina. See *Tab.* XXXIII. *Fig.* 1. and gradually inſinuating it into the Uterus, the Condition of its Mouth may be perceived, and the Time of Delivery thereby known either to be at hand or not. By the ſame Means may be alſo perceived whether the Uterus inclines to either Side, or is diſpoſed directly in the Middle, which laſt is a Sign of a happy Delivery; as alſo whether the Head, Foot, Hand, or other Part of the Fœtus preſents itſelf: from whence may be drawn a reaſonable Prognoſtic, whether the Birth will be eaſy or difficult, as Deventer, a *Dutch* Phyſician, and Van Hoorn, with Widemannus, have The *Os Uteri* ſhould be examined.

well deſcribed in their Books of Midwifery. But without this Touch nothing certain can be determined. There is one Circumſtance to be obſerved in examining by the Touch, and that is to do it when the Pains are remiſs, and to ceaſe when the Pains come on again till they are paſt: and thus the Midwife may be ſatisfied of every particular Circumſtance.

Poſture of the *Fœtus* in Delivery.

VII. This being premiſed, when a Phyſician or Surgeon is called to a Woman in Labour, their firſt Buſineſs is to make a diligent Enquiry of the Midwife, in what Poſture the Infant preſents itſelf in the Womb, whether its Poſition be natural, or preternatural. The moſt natural and convenient Poſture is judged to be, when the Fœtus preſents with its Head downward, and its Face backward towards the Rectum, its Occiput towards the Bladder, its Feet upwards towards the Uterus, and its Vertex or Bregma in the Middle of the *Os Uteri*, as in *Tab.* XXXIII. *Fig.* 2. All other Poſitions are accounted unuſual or unnatural. But there ſtill remain two Poſtures, which may be in ſome Meaſure eſteemed natural, or at leaſt they cannot be termed preternatural, ſince the Infant may be thereby delivered alive, and with no great Difficulty. One of theſe is, when the Feet of the Infant preſent themſelves foremoſt, and then the Birth is termed *Agrippi*, ſee *Fig.* 3. The other is, when the Hips or Nates preſent themſelves to the Mouth of the Vagina, ſo that the Infant is obliged to be drawn out with its Body in an inflected and unnatural Poſture, as in *Fig.* 4. But every Birth does not ſucceed well, in which the Child preſents itſelf in the laſt Poſture: for if the Infant be not quickly delivered by a prudent Midwife, or Surgeon, but remains ſome Time in the Paſſage, it muſt, from the violent Stricture of the Parts and Navel-ſtring, inevitably periſh, even in the Birth. But when the Feet preſent themſelves firſt, the Infant may be then not only preſerved alive, but alſo delivered with much more Eaſe, eſpecially when in the Hands of a prudent Midwife, or Surgeon. And, to ſay the Truth, when other Circumſtances agree, this Poſture may be eſteemed the beſt and moſt convenient of any for the Midwife, becauſe in that the Mother may be aſſiſted more conveniently, as we ſhall hereafter declare more at large. If the Infant lies in any other Poſture, as it may in a great many, which are very dangerous, ſome of which we have repreſented in *Fig.* 5, 6, 7, 8, 9, 10, 11, 12. the Birth is then not only difficult but impracticable: and the Mother and Infant are both in Danger, if the latter be not turned into a convenient Poſture, and then delivered by ſome prudent Surgeon or Midwife.

Management of the Infant preſenting in a natural Poſition.

VIII. If the Foot or Hand of the Infant does not preſent, ſo as to indicate to the Midwife its Poſition in the Womb, a Search is to be made, either with the Finger as we have before directed, or, if the *Os Uteri* be ſufficiently open, by paſſing the whole Hand [a] cautiouſly into the Uterus, when the Pains are off, or at leaſt very remiſs, without which a Perſon may be greatly deceived. If the Head [b] of the Infant preſents to the Mouth of the Uterus (which ought to be well known and diſtinguiſhed by the Midwife from the other Parts of the Body, as the Nates, Knees, Shoulders, *&c.*) and its Body appears either by paſſing the Hand, or by the Touch to be properly diſpoſed; and not-

[a] A ſmall and ſlender Hand is moſt commodious for this Office.

[b] The Unſkilful often miſtake the Shoulder, Knee, Elbow, *&c.* for the Head, to the Injury both of the Mother and Infant.

withſtanding

withſtanding the Birth does not well ſucceed, we may then reaſonably conjecture that there is ſomething amiſs, either in the Mother or the Fœtus: in the firſt, through Fulneſs of Blood, Weakneſs, Straitneſs of the Parts, either by a Contraction or Tumor, an oblique Poſition, or other Defect: in the Fœtus, when its Head is of an unuſual Size, or its Body inconveniently placed, preſenting either the Chin, Face, Ears, Occiput, Shoulders, Arms, Breaſt, Back, or other improper Part. If the Strength and Labour-pains of the Mother are deficient, and the Birth does not ſucceed, the Fœtus being at the ſame Time in a convenient Poſture, either from the Largeneſs of its Head, or Narrowneſs of the Paſſage, it will then be altogether neceſſary to aſſiſt the Mother in her Labour, by adminiſtring proper Aliments and ſtrengthening Medicines, and then to paſs the Hand, firſt anointed with Oil, into the Vagina, in order gradually to dilate the Parts, and preſs back the *Os coccyx* ſtrongly at the inſtant when the Pains and Throws of the Mother exert themſelves, by which means the Delivery proves often happily ſucceſsful. But if any other Impediment ſhould be ſtill remaining, it ſhould be alſo removed in courſe, as if there be a too great Redundancy of Blood, a Vein ſhould be opened. If the Paſſages ſhould be too narrow, as they frequently are in the firſt Childbirth, or if they are too dry in thoſe who are advanced in Years, it may then be proper to lubricate them with Butter, Oil, or other emollient Subſtances, and then to dilate the Parts with the Hands and Fingers, as we ſhall preſently declare more at large [a]. If the Vagina ſhould be obſtructed by ſome Membrane, it may be removed by proper Inſtruments in the Manner we have directed at *Chap.* CXLVI. *& ſeq.* If the Parts ſhould be ſo much ſwelled as to deny a Paſſage to the Fœtus, they ſhould be fomented with diſcutient Cataplaſms, or Decoctions *ex flor. Chamomelæ Verbaſci Sambuci & fol. Altheæ, Malvæ*, &c. boiled in Milk, and applied warm. If the Paſſage of the Vagina ſhould be obſtructed by any Tumor, large Fungus, or fleſhy Excreſcence, it may be proper to extirpate the ſame, as we have directed in *Chapter* CXLIX. Laſtly, if the Paſſage ſtill remains too narrow, either from a Calloſity, or Adheſion of the *Os Uteri* and Vagina, or the like; or if the Uterus ſhould be burſt, and the Fœtus preſſed into the Cavity of the Abdomen, there then remains but one and a ſevere Method of extracting the Fœtus, *viz.* by the *Cæſarean* Section, concerning which we have treated at large in *Chapter* CXIII. But if none of theſe Obſtacles appear, and the Birth does not ſucceed, from the Parts being too narrow, notwithſtanding the Infant lies in a proper Poſture, and is aſſiſted by the Mother's Throws; in that Caſe the Patient is to be firſt laid in a proper Manner upon a Bed, with her Hips raiſed ſomewhat higher than her Head, or ſhe may be placed in the Chair at *Tab.* XXXIII. *Fig.* 15. Then, after diſcharging her Urine, the Midwife is to paſs her Hand, lubricated with ſome Ointment, Oil, or other fat Subſtance, into the Vagina [b], and therewith gradually to dilate the Parts, and preſs back the *Os coccyx* more eſpecially at the Inſtant of the Mother's Pains and Throws; by which means the Head will by

[a] We have a remarkable Inſtance given us by VOLTERUS (*de Art. Obſtet.* p. m. 112.) of a Woman, whoſe Paſſages were ſo narrow, that out of ſeven Births, not one ſucceeded, but the Fœtus was obliged to be extracted in Pieces. More Inſtances occur in medical Writers.

[b] It is to be obſerved, that the Labour-pains are ſeldom abſent, when the Hand is thus introduced into the Womb, where its Stimulus is uſually ſufficient to excite them.

Degrees

Degrees follow the Hand, which may lay hold of it, if poſſible, and draw it gently out: Or if its Body preſents in an oblique or preternatural Poſition, (as in *Tab.* XXXIII. *Fig.* 8 & 9.) Endeavours are then to be uſed to turn it into its natural and eaſy Poſture with the Hand, not neglecting at the ſame Time to adminiſter ſtrengthening Medicines to the Patient internally, to excite the Birth when it is impeded by the Abſence of her Labour-pains. But if the Fœtus cannot be eaſily turned into its natural Poſition, the Feet are then to be taken hold of, and drawn out with the reſt of the Body. If the Membranes including the Fœtus are too tough and ſtrong to break of their own accord, ſo that they impede the Birth, notwithſtanding the Mouth of the Uterus is ſufficiently open, and the Head of the Infant may be felt through them, the Midwife may then venture to divide or lacerate the Membranes, either with her Fingers ends or a Hook. But Care ſhould be taken not to break them 'till the *Os Uteri* is ſufficiently dilated: otherwiſe the Birth will be thereby rendered extremely difficult. For the reſt, it is always adviſeable to abſtain from the Uſe of Inſtruments in difficult Labours as long as the Infant continues alive, and the Mother in full Vigour: otherwiſe there is Danger of wounding and maiming, if not killing one of them. But if the Mother's Strength fails her, and the preceding Symptoms of Death approach, or may be ſhortly expected, the Fœtus ſhould then be timely extracted, by the Feet; or, when that is impracticable, by leſſening it with Inſtruments, in order to preſerve the Mother: for it is much better to endeavour by this Means to preſerve one, or both, than by too long Delays to loſe both.

Admonition for this Poſture of the Fœtus.

IX. It may be of Conſequence to obſerve in this Place, that though the Head of the Infant preſenting to the Mouth of the Uterus is generally eſteemed the moſt natural Poſition; yet it ſometimes happens from the fore-mentioned Cauſes, and eſpecially from an oblique Situation of the Uterus, that not the Vertex of the Head, but rather its Sides, the Face, Ears or Occiput, correſpond to the Center of the Vagina as in *Fig.* 8 & 9: by which Means the Birth is frequently rendered ſo difficult, as not to give way, either to the Endeavours of the Mother, or all the Aſſiſtances of Art. The Generality accuſe Largeneſs of the Child's Head, but unjuſtly; ſince that is frequently obſerved to be no larger than uſual, and is often actually paſſed through the narrow Mouth of the Uterus. But the moſt common Cauſe of this Difficulty, is rather the Shoulders of the Fœtus reſiſting againſt the Bones of the Pelvis; eſpecially when the Head preſents ſide-ways, as it is too ſlippery and round to be held faſt by the Hands, its Extraction becomes thereby impracticable, and, being compreſſed by the Stricture of the Parts, it muſt inevitably periſh in a little Time. Therefore when the Head preſents in this Poſition, it is rather feared, than approved of as a good Sign by the moſt expert Midwives, who therefore chuſe to alter its Poſition; for, in this Caſe, there is no paſſing of the Hand into the Uterus to turn the Infant, its Head being ſo cloſely wedged in between the Mouth of the Uterus and Sides of the Vagina; ſo that frequently no Aſſiſtance can be adminiſtered either to the Mother or Fœtus, but either one, or both, muſt be inevitably loſt. See *Chap.* CXIII. of the *Cæſarean Section*, as alſo Deventer, Hoornius, La Motte, Chapman, Manningham, and others.

X. In

X. In this Difficulty PALFYN, to avoid injuring the Fœtus with Hooks, or other rough Inſtruments, has contrived a kind of broad and double Scoop without any Edge; which, being flat, he applies to each Side of the Head, and thereby endeavours to extract the Fœtus without lacerating or wounding any Part of it. See the Figure of this Inſtrument, *Tab.* XXXIII. *Fig.* 16. but the Size of this Inſtrument, which was ſent me by the Author, is as large again as the Figure [a]. This Inſtrument he would have applied, when the Fœtus is yet alive, or at leaſt when we are not certain of its Death. But the Generality of Infants, who have had their Heads compreſſed in this Manner, are thereby ſo much weakened, and their vital Functions ſo much deſtroyed, that they may be looked upon as dead, and may be therefore extracted with Hooks by the common Method. I have indeed uſed this Inſtrument of my friend PALFYN, but without Succeſs: for if you compreſs the Head with it but gently, the Fœtus is held too firm to give way to it; and if you preſs it too ſtrongly, there is Danger of wounding its tender Head. I therefore endeavoured to amend the Inſtrument, by joining its two Parts together with a Hinge: but even then it did not anſwer Expectation [b]. In this deplorable Situation of the Fœtus we have therefore no Remedy left but the *Caſarean* Section, or to extract the Fœtus either dead or alive with Hooks (repreſented *Tab.* XXXIII. *Fig.* 17 and 18.) or other Inſtruments, to preſerve the Life of the Mother. However, we ſhall hereafter propoſe, at § 20 and 21, ſome Artifices which may be of Service in Caſes of this Nature.

PALFYN's Method of operating.

XI. If the Infant ſhould be diſpoſed in any other unnatural Poſture, like thoſe repreſented in *Fig.* 5, 6, 7, 8, 9, 10, 11, 12. if it be not changed or turned by the Hands of a dextrous Midwife, it will be hardly poſſible for the Birth to ſucceed; but the Life both of the Mother and Fœtus will be in the utmoſt Danger. In that Caſe the Adminiſtration of forcing Medicines to excite the Birth, will be highly pernicious, by ſpending the Mother's Strength before it is requiſite, or killing the Fœtus by a too violent Compreſſion of the Womb, by exciting a profuſe Flooding; or, laſtly, by cauſing a Rupture or Gangrene, if not other malignant Symptoms. Therefore nothing is more neceſſary in this Caſe, than dextrouſly to turn the Child into a proper Poſture by the Hand firſt dipt in Oil, and then to extract it ſo ſoon as poſſible. We are furniſhed with many Artifices by Authors for turning and extracting the Fœtus: but not a few of them are either impracticable or pernicious. For there ſeems to be no more certain Way of inverting the Child in the Womb, and of extracting it, than by prudently introducing the Hand, after it has been oiled, into the Uterus; (See *Tab.* XXXIII. *Fig.* 6, 10, and 11.) and having laid hold of the Feet, the Infant is to be thereby gradually and cautiouſly extracted. And this we lay down as a general Rule to be obſerved, whenever the Infant preſents in an unnatural Poſture, except when the Head preſents very nearly in its right Poſture, or at leaſt may be very eaſily altered into it. Nor is any other

Management when the Infant's Poſition is unnatural.

[a] This I am told by my Friend, who communicated this Inſtrument of PALFYN's to me.

[b] Yet this gave the hint to ſome other Surgeons, and particularly the *Engliſh*, to contrive a further Amendment of this Inſtrument; which is now called the *Engliſh* Forceps. See *Plate* XXXIX. *Fig.* 10.

Method

Method practicable, which we are directed to by ſome ancient, but leſs experienced Practitioners, I mean, to turn the Child into its natural Poſition; when it cannot be laid hold of in ſo ſmall a Compaſs, the Uterus not only contracting itſelf to a very great Degree: but the Roundneſs and Lubricity of the Head, are Obſtacles not to be ſurpaſſed. Beſides, there would be great Danger of compreſſing and injuring the Brain, Eyes, and other Parts of the Head, by ſo great a Force as muſt be required to turn the Infant by that Part. Therefore the Advice of thoſe is not to be followed, who direct the Infant to be turned into its natural Poſture, in whatever Manner it preſents in the Womb. La Motte agrees with me, that though the Head of the Fœtus may be turned to its natural Poſition, yet it is often more adviſeable to extract it by the Feet; ſince the whole may be done in leſs Time than the Head can be inverted, by which means the Mother may be ſooner delivered, and the Infant more likely to be live-born. Even when the Head has been, after much Trouble, in this Manner reduced into the deſired Poſture, the Delivery is not compleated, but Nature muſt perform her Part, and the Patient has in a Manner all her Pains and Throws to go through again. And if ſhe ſhould be weak, or otherwiſe incapable, the Feet of the Infant muſt be again after all ſearched for, and thus extracted; tho' perhaps it may not be poſſible, or at leaſt not ſo eaſy again to paſs the Hand through the Mouth of the Uterus, now obſtructed by the Head of the Infant. So that by thus delaying, the life of the Fœtus is either loſt in the mean Time, or in its Extraction; and the Mother ſuffers much more than ſhe need to have done, frequently expiring ſoon after: or elſe the Fœtus muſt be extracted by Inſtruments, as the laſt remedy to ſave the Mother. It is therefore in my Opinion highly preferable to extract the Infant at firſt by the Feet, rather than to loſe Time, and perhaps miſcarry in the Operation, by endeavouring to turn its Head into the natural Poſture for Delivery.

When the Fœtus is to be turned.

XII. Before we proceed to give particular Directions for inverting the Infant in the Womb, and extracting it, it will be firſt proper to declare in what Caſes it is highly neceſſary thus to turn and to extract the Infant by its Feet. This Inverſion and Extraction is to be therefore performed, 1. Whenever any other Part of the Infant preſents beſides the Vertex of the Head with its Face towards the Rectum. See *Tab.* XXXIII. *Fig.* 5 to 12. 2. In all Caſes in which ſome other Part of the Infant comes out of the Uterus beſides its Head; and particularly when the Hand or Navel-ſtring appears in that Manner, and the Midwife cannot return it without its being excluded, again as before, by the ſucceeding Throws of the Mother. 3. Whenever the Head preſents itſelf ſideways with the Ears, Face, Chin, or Occiput towards the Mouth of the Uterus, being wedged in ſo as not to be turned without much Difficulty, as may be ſeen in *Fig.* 8 and 9. 4. Whenever the Back, Belly, or Side of the Infant preſents, as in *Fig.* 5 and 7. 5. When the Infant is even in its natural Poſition, but the Birth does not ſucceed, and there is Danger of loſing the Life either of the Fœtus or Mother by Delay; as when her Strength fails her, a violent Flooding enſues, or when ſhe is ſeized with Convulſions or epileptic Fits. In all theſe Caſes there is great Danger of loſing both the Mother and Fœtus, if the latter be not timely extracted by the Feet; which ſhould be performed by paſſing the Hand under the Face and Breaſt of the Infant down to its Feet.

6. When-

6. Whenever the Navel-ſtring ſlips out of the Uterus before the Head of the Fœtus: for if it be not then immediately extracted, the Circulation being intercepted between the Mother and the Infant, by compreſſing the umbilical Cord, will be attended with the certain Death of the latter. And, laſtly, 7. we may add, whenever the Uterus is obliquely ſituated, notwithſtanding the Fœtus preſents in its natural Poſture: for it is generally much eaſier in thoſe Caſes to extract the Infant by its Feet, than to alter the Poſition of the Uterus from an oblique to a ſtraight Direction. Therefore in all theſe, and ſuch like Caſes, where Delay is dangerous, it is better in this Manner to haſten the Delivery, than to ſlip the critical Opportunity, as DEVENTER, and others, whom we quoted in the VIII^th Section of this Chapter, have largely demonſtrated.

XIII. Among the innumerable preternatural Poſitions, in which the Infant preſents, we meet with none more frequent and dangerous, than when its Hand or Arm firſt appears, as in *Fig.* 11. which Poſition we ſhall therefore firſt conſider. If the Hand of the Infant is perceived through the Membranes at the Mouth of the Uterus before the Waters are diſcharged, it frequently withdraws that Part, of itſelf, if the Midwife pinches or hurts its Fingers, and turns its Head in the room of it, whereupon the natural Birth ſucceeds[a]; or perhaps in this Caſe it preſents its Feet. But if the Waters are already diſcharged, it will ſignify nothing to pinch the Fingers, becauſe the Uterus is then ſo cloſely contracted, that its Hand is immoveable. The Generality of Practitioners adviſe in this Caſe, to return the Arm or Hand into the Womb, and preſent its Head, after which they are to commit the reſt to Nature. But as there is great Danger in waiting in that Manner, it is in my Opinion much better to extract the Infant as ſoon as poſſible by its Feet. For if the Arm comes firſt, the Infant lying croſs with its Head on one Side, and its Heels on the other, it muſt be impoſſible for the reſt of the Body to follow the Hand of the Extractor: it is even generally much eaſier to pull off the Arm, than thereby to extract the reſt of the Body, except the Fœtus be imperfect, or elſe very ſmall; and then I have ſeen it ſometimes this way extracted. In this difficult Caſe the Midwife ought, without Delay, to paſs her Hand and Arm lubricated with Oil, into the Uterus, even up to her Elbow, when it is neceſſary, as in *Fig.* 10 and 11. and taking hold of the Feet, the Infant is to be thereby inverted and extracted, without ſtaying to replace its Arm, or remove its Head, which cannot be done without ſome Difficulty, eſpecially when it has been a conſiderable Time in that Poſture. Whoever prudently conſiders this dangerous and difficult Preſentation of the Fœtus, and is alſo acquainted with the Structure and Poſition of the Uterus, and Bones of the Pelvis, will readily conceive in what Manner the Infant is to be turned, when it preſents in other Poſtures. I need only adviſe them to take Notice, that when they paſs the Hand into the Uterus, they ought to preſs it againſt that Part of the Vagina next the Rectum: otherwiſe they will meet with a Reſiſtance from the *Os Pubis*.

Eſpecially when the Hand or Foot appears.

[a] This is an Obſervation of SIGISMUNDA, Midwife of *Brandenburg*, after whom it has been taken Notice of by DEVENTER, and other Writers.

This Posture further considered.

XIV. Since we have proposed this Posture of the Fœtus as an Example, whereby the Midwife may know how to treat it when in others, we shall consider it a little more at large. And first, a convenient Posture in the Patient is of no small Importance, in order to procure an easy Delivery[a]. The Mother may be therefore most advantageously placed in a Chair for this Purpose, having a moveable Back, which may be elevated or depressed at Pleasure, while the Patient's Back is supported by it, as on a Bed; see *Tab.* XXXIII. *Fig.* 15. Or, when that is not at hand, she may be laid a-cross a Bed, Couch, or Table, or upon four common Chairs placed opposite to each other, which, being covered with Cloaths and Pillows, the Patient may be laid on them, with her Hips elevated a little higher than her Head, according to Celsus, and the Parts conveniently disposed for the Midwife to perform her Office. This done, the next Business is to enquire which Hand of the Infant presents, that thereby a Judgment may be formed in what Manner the rest of its Body lies in the Uterus. And if from this Consideration it appears, that the Feet of the Infant lie on the left Side of the Abdomen, as in *Fig.* 11. in that Case the right Hand of the Midwife, being lubricated with Oil, should be gently passed into the Uterus, pressing aside the Head and Hand of the Infant, to make way for the rest of the Arm; then turning it gently towards the Legs and Thighs, and afterwards endeavouring to lay hold of and extract the Feet of the Infant. And this should be performed with the more Slowness and Caution as the Feet are very often separated from each other, and stretched upwards: but when the Case has not been long delayed, nor the Uterus much contracted, the Feet being as yet pretty near together, there is then generally no great Difficulty in apprehending, and extracting the Feet in this Manner. If the Feet are not in this Manner laid hold of, all other Endeavours will prove fruitless; and the Uterus contracts itself so strongly, as scarce to admit the Hand for this Purpose, which generally requires it to be passed up to the Elbow, as in *Fig.* 10 and 11. If the Hand of the Midwife should fail or be tired by too long searching, it may be then drawn out, and after some Respite introduced again, or the other used instead of it, to search for the Feet: when found, they are to be gently extracted, and the Infant thereby turned and drawn out, but not upward, nor in a strait Line, but downward and backward, because the Angle of the *Os Pubis* is that way largest. If only one of the Feet can be found, it may be carefully drawn a little way out of the Uterus, and secured with broad Tape from being drawn in again. Then the Midwife passes her Hand, as represented in *Fig.* 12. in order to take hold of the other Foot; which, being gently drawn out like the other, both of them are then to be wrapt up in a warm linen or woollen Cloth, because of their Lubricity, that they may be more firmly held, in order to make a gradual Extraction of the Infant, which should be in a prone Posture. But if the Hand cannot reach the End of the Foot, either from a Stricture of the Uterus, or other Cause, in that Case I take hold of the Leg, and thereby turn the Fœtus, and draw its Knee to the *Os Uteri*, and thereby the Foot, and then by both of them I deliver the Fœtus as before.

[a] Upon this Subject it may be worth while to consult a Dissertation, *De Partu difficili ex Infantis Brachio prodeunte, sub* Wedelii *præsidio.* Jenæ 1732.

XV. If

XV. If the Infant appears to lie in a ſupine Poſture, in extracting it, as in *Fig.* 3. when the Legs have been drawn out as far as the Abdomen, it ſhould be dextrouſly turned upon its Belly[a], by taking hold of the Hips: otherwiſe there will be Danger of the Chin ſticking againſt the *Os Pubis*, and of the *Uterus* contracting itſelf about the Neck of the Infant, ſo as to kill it, as it frequently happens with baſe and imprudent Midwives: but when the Infant can be eaſily turned upon its Abdomen, the Birth generally proves eaſy. However, it ſhould be obſerved which Side will be moſt convenient to turn it upon; for on one Side it may ſucceed very happily, whereas in turning it on the other, you are in Danger of twiſting the Neck of the Fœtus: and, in extracting it, it will be better to draw it out, by turning in a ſpiral, than in a ſtraight Direction. But if it has been drawn out as far as the Abdomen, and we are then unwilling to turn it, the Hand is to be paſſed into the Uterus under the Arch of the *Os Pubis* upon the Abdomen of the Infant, that while it is extracted by one Hand, its Face and other Parts may be prevented from being injured by the *Os Pubis* with the other. To return the Arm of the Infant into the Uterus, when prolapſed before its Extraction, as ſome adviſe, is not only uſeleſs or unneceſſary, but very often dangerous and impracticable. If the Feet of the Infant are turned towards the right Side of the Mother's Womb, they may be moſt commodiouſly ſearched for and extracted with the left Hand. But it ſhould be obſerved, that there is ſome Reaſon for paſſing the Hand to the Extremity of the Thigh, when one Leg is extracted, and the other ſearched for, to ſee that they belong to one Infant, leſt there ſhould be Twins, and, by extracting two Legs of different Infants, both of them might be greatly injured[b]. The Methods, which we have hitherto propoſed, will generally prove ſufficient in the Hand of a prudent Midwife for moſt preternatural Births: For if the Head does not directly preſent in its right Poſition beforementioned in § VII. the Feet are to be then ſearched for, and extracted in the Manner here propoſed without Delay; by which Means the Birth generally ſucceeds happily both to the Mother and Infant. But if it be delayed till the Uterus has ſo violently contracted itſelf, as hardly to admit the Hand, and allow Room for it to move, it renders the Caſe extremely dangerous for both, and particularly the Infant; and therefore it will be moſt prudent to compleat the Operation as ſoon as poſſible.

Some Obſervations and Cautions.

XVI. From what has been now ſaid, the following Obſervations may be made. 1. If the Infant's Feet preſent, or come out of the Uterus, as in *Fig.* 3. they ought not to be returned, much leſs ought the Head of the Infant to be inverted in the room of them, as many have formerly directed: but, on the contrary, the Feet ſhould be taken hold of, and extracted as ſoon as may be

Rules or Directions from the preceding.

[a] The Generality of the Moderns adviſe the turning of the Infant in this Manner upon its Abdomen; but the experienced Hoorn aſks, with good Reaſon, whether it may not, in many Caſes, be better to free the Head, and other Parts of the Infant, from the Arch of the *Oſſa Pubis* without turning it, in the Manner we ſhall preſently direct; becauſe that Method often twiſts, or diſtorts the Neck of the Infant, and generally gives the Midwife more Trouble than freeing its Head, as before. See Hoorn. *Obſ.* 26.

[b] La Motte, and the reſt of the modern Writers, think this Caution uſeleſs and ridiculous; becauſe, ſay they, Twins are not included in one common, but each in its diſtinct Membrane; and therefore the Feet of one cannot be entangled with the Feet of the other: but they ought alſo to have conſidered, that the Membranes of each may be broke, and their Feet then entangled in the Birth, ſo as to render this Caution frequently, though not always, neceſſary to be obſerved.

with Conveniency, by which means the Birth will be much eaſier, even than when the Head preſents, provided the Infant is extracted with its Face downward, as we have before directed. But it is generally better for Women, who are this way delivered to be laid upon a Bed, than in the Chair deſcribed for that Purpoſe. 2. If the Hand of the Infant preſents together with one or both of the Feet, the latter are notwithſtanding to be taken hold of and extracted according to the preceding Directions, gently preſſing back the Hand at the ſame time. 3. If the Hand preſents itſelf with the Nates, it is then alſo to be extracted in the ſame Method, if the Feet can be taken hold of; but if that cannot be conveniently done, the Nates may be extracted firſt, with the reſt of the Body following, as in *Fig.* 4. 4. When one Foot is extracted, and the other cannot be found, the Buttock of the ſame Side preſenting itſelf, indicates that the Leg is bent towards the Abdomen; which if ſo, the Infant may be drawn out by one Leg. 5. If the Fœtus cannot be turned with one Leg, when the other cannot be found, that Leg is to be brought to the Mouth of the Uterus, and ſecured with a Bandage, while the other is ſearched for; which when found, the Inverſion may be ſafely performed. 6. If the Navel-ſtring appear betwixt the Legs of the Fœtus while it is extracting by the Feet, the Operator ſhould deſiſt, and draw the Navel-ſtring a little more out of the Uterus, ſo that it may make a Loop or Arch, through which the Legs are to be paſſed when bent, and after them the reſt of the Body; by which means it may be cleared without any Danger. But if, on the contrary, the Navel-ſtring is left between its Legs till the whole Infant is extracted, the Navel-ſtring may be by that means lacerated, or broke off ſo near to the Abdomen, that it cannot be afterwards tied, of which Death may be the Conſequence. 7. The Operator need not be ſollicitous about the Infant's Arms, when it is extracted by the Feet, becauſe they generally follow the Body: and if one ſhould endeavour to extract them by the Side of the Body before the Head, the Neck will by that Means be compreſſed by the contracted Mouth of the Uterus, and the Head will be alſo retained in ſuch a Manner, as to occaſion the Death of the Infant, if it be not prevented by ſome Artifice, which Accident does not happen when one or both of the Arms accompany the Neck. 8. When only one of the Feet preſents itſelf, as in *Fig.* 12. it is not neceſſary to return it, and invert the Head of the Infant in the room of it; but notwithſtanding the Infant ſhould not be forcibly extracted by that one Leg alone: but it is better to ſearch alſo for the other with the Hand, as in *Fig.* 12. and to draw out the Infant by both of them together. Yet when the other Leg is bent up towards the Abdomen, then the Infant may be ſometimes extracted by one alone, as we have before obſerved.

When the Infant's Nates preſent firſt.

XVII. When the Nates of the Infant preſent themſelves foremoſt, as in *Fig.* 4. it may indeed be ſafely delivered that Way; but not without Difficulty, eſpecially when the Paſſages are narrow. For when the Legs and Thighs are in this Manner complicated with the Body, there is great Danger of the Infant's being killed by the Violence of the Compreſſion, as frequently happens when the Mother falls in Labour by herſelf, or elſe without the Aſſiſtance of a prudent Midwife: or at leaſt, if the Infant be not killed, the Parts of the Mother will be lacerated, and greatly injured. And therefore if the Nates are not too far excluded

excluded to be conveniently returned, the Mother being laid down upon her Back with her Hips elevated, it may be proper to preſs them back gradually, and, proceeding from the Thigh to the Leg, to lay hold of the Foot which is neareſt, and extract it, ſearching afterwards for the other Foot, that the Infant may be delivered by both of them: but if they cannot be thus conveniently extracted together, the Infant may be delivered by one of them. However, if the Nates are ſo far excluded, that they cannot be returned, or the Foot cannot be found, it will then be neceſſary to lay hold of the two Hips with each Hand, paſſing the Fingers, eſpecially the firſt, into each Groin like a Hook, in order thereby to extract it, as at *Fig.* 4. and that without any Delay, leſt it ſhould be killed by the Compreſſure. And if the Infant in this Poſition ſhould lie with its Face upwards after its Legs have been drawn out, it ſhould be turned into a prone Poſture, except the Operator is capable of freeing the Chin and Face from the Arch of the *Os Pubis* without being injured.

When the Head or Shoulders ſtick by the way.

XVIII. When the Shoulders of the Infant are retained in the Uterus, its Head and Neck being excluded, the Buſineſs of the Midwife is then to paſs her Fingers prudently under each Arm, and, by drawing them forward, the reſt of the Body will follow without much Difficulty, eſpecially if it be drawn backward towards the Rectum, where the Angle of the *Os Pubis* is largeſt; which is alſo a Circumſtance to be obſerved in moſt other Caſes. But, on the contrary, if the Fœtus preſents with its Feet foremoſt, and its Exit is obſtructed by the Arms or Shoulders, the Fingers are to be paſſed on one Side of the Infant, and one Arm thereby cautiouſly extracted, leaving in the other; and then the reſt of the Body will eaſily follow, eſpecially if the Fœtus is in a prone Poſture, and gently turned from one Side to the other in its Extraction. The Arm left in the Uterus, is to prevent the Neck of the Infant from being too ſtrongly compreſſed by the Mouth of the Uterus, which would otherwiſe retain the Head, and ſtrangle the Infant. But it very often happens, that the Infant, which is extracted with the Feet foremoſt, if the Hand is not conveniently paſſed between its Face and the *Os Pubis*, will notwithſtanding be catched by the Neck, from the Stricture of the *Os Uteri*, eſpecially when its Face and Chin lie upwards. And if one ſhould endeavour to force it out by Violence, they will ſooner pull off the Head, than accompliſh their Deſign, which they will be more likely to compleat, by paſſing the Hand over the Neck and Chin of the Infant, ſo as to prevent the Parts of its Face from catching againſt the *Os Pubis*, preſſing it backwards towards the *Rectum* at the Time of its Extraction. A great many adviſe in this Poſition of the Infant, to paſs the two Fore-fingers into its Mouth, in order to draw out the Head: but as by that Means the lower Jaw may be eaſily diſlocated, broke, or pulled quite off, I think the preceding Method is much preferable. But if the Infant lies in a ſupine Poſture, and its Chin is reſiſted by the Arch of the *Os Pubis*, ſo as not to be extricable by all the Artifices of the Midwife, in that Caſe VAN HOORN thinks the Birth will ſucceed more eaſily, if an Aſſiſtant lifts up the Feet of the Infant, while it is drawn gently forward. The ſame Author alſo obſerves, that ſometimes the Neck is twiſted by endeavouring to turn round the Fœtus, when its Head is in this Manner fettered: and if this be the Caſe, the Hand is to be prudently introduced

troduced to free the Parts, as we before directed. If the Fœtus appears to be dead, it may be extracted in the ſame Manner, and with leſs Caution.

Directions from the foregoing.

XIX. We ſhall, for the ſake of Beginners, here relate a few more Directions, which are deduced from what we have before advanced. As, 1. When any other Part but the Head is perceived by the Touch, (the Membranes remaining entire) ſuch as the Foot, Hand, Knee, Navel-ſtring, *&c.* in that Caſe the Membranes are to be opened, either with the Fingers, Nails, or an Inſtrument, and the Feet are to be ſearched for, and the Infant thereby extracted. 2. But if the Head lies almoſt in its natural Poſition, and may be eaſily reduced to it, it may be done by the Hand: otherwiſe it muſt be extracted immediately by the Feet. 3. When the Waters are diſcharged before the Midwife is called, Search is to be made after the Poſition of the Fœtus; and if the Head preſents in its right Poſition, it may be concluded, that the Birth will ſhortly ſucceed: but if any other Part offers, it ſhould be delivered by the Feet. 4. When the Chin, and Part of the Face, are obſtructed by the *Os Pubis*, they are to be relieved by paſſing the right Hand betwixt them, preſſing towards the Rectum, while the Paſſages are dilated, and the *Os coccyx* ſtrongly preſſed back with the left Hand. But if the Birth does not ſucceed after a ſhort Time when the Waters have been diſcharged, and the Head preſents in its natural, or any other Poſture, the Feet are then to be ſearched for, and the Infant thereby extracted, eſpecially when it is rendered ſtill more neceſſary by the urgent Pains and Throws of the Mother. 5. When the Neck or Shoulder preſents, the Head being inclined to one Side, as in *Tab.* XXXIII. *Fig.* 8. if the Shoulders cannot be removed, and the Head properly diſpoſed, then alſo it is to be extracted by the Feet. 6. If the Head of the Fœtus preſents in a prone Poſture, with either of its Arms in the Vagina; in that Caſe the Midwife is to paſs one Hand over the Mouth and Chin of the Fœtus, and the other under its Arm; and thus it may be often extracted by both Hands. But, 7. if both Hands cannot be brought through the Vagina, ſhe is to endeavour to extract it by the Feet. 8. In all tranſverſe Poſitions of the Fœtus, it ſhould be extracted by the Feet. 9. When the Navel-ſtring comes out with the Head, they are both of them to be ſpeedily returned, or the Infant will periſh: but if it ſlips out again, in all Poſitions of the Fœtus, it ſhould be then extracted by the Feet without further Delay. 10. If the Fœtus preſents in its natural Poſture with the Navel-ſtring about its Neck, the Caſe is not then ſo dangerous; but it may be untwiſted, and the Fœtus afterwards extracted: otherwiſe, to prevent it from being broke, it may be cut in two near the Neck, and compreſſed by the Fingers of an Aſſiſtant till the Birth is over; when it may be ſecured with a Ligature. 11. When there are Twins, the Navel-ſtring of one is to be firſt divided, and ſecured by Ligature ſo ſoon as it is delivered, and then of the other. But if the Waters are not yet diſcharged, we are not to wait till they break forth of themſelves: for by ſuch Delays, both the Mother and Fœtus are often in the higheſt Danger. And therefore it may be proper to divide the Membranes, and deliver the Infant, while the *Os Uteri* is relaxed, before any ſpaſmodic Contraction of the *Uterus* comes on, which might render the Delivery then impracticable.

Difficulties from the bad Diſpoſition of the Head and Uterus.

XX. When the Vertex of the Infant's Head does not directly correſpond to the Vagina, either before or ſoon after the Diſcharge of the Waters, but is inclined to either Side, or lies towards the *Os ſacrum*, or *Os Pubis*, the Birth is then likely to be very dangerous, as we have before obſerved in § VIII. and IX. If

therefore

therefore the Midwife cannot conveniently reduce the Head of the Fœtus to its natural Position, when it is thus obliquely situated, and the Birth will not succeed, notwithstanding her Endeavours by pressing with one Hand upon the Abdomen of the Mother, and, by dilating the Parts, and pressing back the *Os coccyx* with the other, the Infant should then be immediately extracted by the Feet, as we have before directed; and this more especially, when a violent Flooding, or excruciating Pains, with fainting Fits, seize the Mother.

Of the most difficult and dangerous Births.

XXI. Lastly, it is not undeservedly reckoned one of the most difficult Cases, when the Head of the Fœtus descends so far into the Vagina as to be visible, and at the same Time is so strongly retained, that neither the Endeavours of the Mother, nor of the Midwife, can set it at Liberty. For in this Case the most prudent may be deceived in their Expectations of a happy Birth, from the Child presenting itself in a natural Position, as we have before observed at § IX, so that both the Mother and Fœtus may be lost, if the latter be not timely extracted, either by the Hands or Instruments. The Cause of this Difficulty is commonly attributed to the Largeness of the Infant's Head, but generally without Reason; because we find it has been small enough to pass through the narrow *Os Uteri*. I should rather imagine it to proceed from an oblique Situation of the *Os Uteri*, or from the Resistance which the Shoulders meet with against the *Os Pubis*, when the Infant presents Side-ways; which may be generally known by one of its Ears being upward, and the other downward. In this difficult Case there are two Methods to be followed: 1. By passing the two Fore-fingers of each Hand, at the Time when the Pains urge, in order to press back the Rectum and *Os coccyx*, that the Head may descend as low as possible; and then to pass all the four Fingers of each Hand about the Head, so as to lay hold of it, and, by dilating the Parts, at the same Time to free it as much as possible from the Stricture, till the Hands can pass behind the Ears and Occiput, so as to have sufficient Hold for extracting it. But sometimes this alone will not be sufficient: but it is also necessary to draw out one of the Arms, especially the lowermost, in order thereby to extract the Fœtus, and free it from the Resistance of the *Os Pubis*. 2. The other Method is, when the Rectum has been pressed back, as before, to pass the left Hand under the Head of the Fœtus, after it has been first lubricated with Oil, to grasp it as a Globe; then to pass the Fingers of the right Hand above the Head under the *Os Pubis*, endeavouring to extract it, pressing a little backward, and advising the Mother to exert her Strength at the same Time, as HOORN observes. The Head thus extracted, the Neck of the Fœtus may be then taken hold of by one Hand, and the Head drawn forward, by moving it from one Side to the other; while the Hand, which is under the Neck of the Fœtus, extracts the nearest Arm, and, by turning the Infant upon its Belly, drawing it gently forward at the same Time, it comes forth almost of itself. But when all these Methods prove fruitless, the Mother's Strength gradually decays, and her Life is threatened with the most malignant Symptoms, the Operator is then obliged to lay aside Compassion, and extract the Fœtus, whether dead or alive, by Instruments. This may be done, either 1. by opening the Head with an Incision-knife, or Pair of Scissars, and extracting the Brain with the Fingers or a Scoop, after which the Head collapsing, it may be more easily taken hold of and extracted, either by the Hand, a Pair of large Stone Forceps, or as DEVENTER advises, by binding a broad

Tape-

Tape about its Neck behind the Head: which laſt Method, he aſſerts, will frequently ſucceed, without extracting the Brain. But if, notwithſtanding the Extraction of the Brain, it does not come forward, the Shoulders are to be freed from the *Os Pubis*, and the Fœtus thereby extracted. 2. The Extraction may be made with a Hook repreſented in *Tab.* XXXIII. *Fig.* 17 and 18. in defect of which, in Caſe of Neceſſity, HOORN uſes a large Nail, bent in form of a Hook, to which a Ligature is faſtened, that it may be held and drawn with more Eaſe. Or, 3. it may be performed by the Inſtrument of MAURICEAU, which he deſcribes, and calls *Tire-tête:* which is, however, in my Opinion, leſs commodious than the Hook of DEVENTER and HOORN. And almoſt in the ſame Manner is the Fœtus to be extracted, when it cannot be delivered by the Hands in many other Caſes, which threaten the Life of the Mother, as in monſtrous Births, where there are two Heads, *&c.*

Of the *Engliſh* Forceps.

XXII. But indeed all theſe Methods are calculated for the Preſervation of the Mother rather than the Fœtus, as the *Cæſarean* Section reſpected the Fœtus rather than the Mother; and though they may be very proper for extracting dead Infants that are wedged in by the Head, yet if the Infant be alive, they generally deſtroy it. The wiſeſt therefore of our modern Phyſicians and Surgeons have endeavoured to find out an Inſtrument, which might ſave both, and extract, if poſſible, the Fœtus alive. Among the reſt, PALFYN, as I before obſerved Sect. X. contrived a kind of flat Hooks, without any Edge, for this Purpoſe; which you will find repreſented in Plate XXXIII. *Fig.* 16. by means of which the compreſſed Head of the Fœtus might be eaſier extracted without lacerating or wounding. But as I found by Experience, that thoſe were inſufficient, eſpecially where the Head was very cloſely locked in; nor did they retain it firmly, on account of its Lubricity; I therefore judged it expedient to contrive ſome Method of joining the Hooks together to give them a greater Force. Hereupon many Surgeons were ſet to Work, to improve this Inſtrument; and connected the Hooks by Means of a Ligament, or by a Hinge in the Form of a Forceps: by which they extracted not only dead, but the living Fœtus with Succeſs, though ſtrongly wedged in by the Head; as CHAPMAN, GIFFARD and BOEHMER teſtify in their Writings on the Practice of Midwifery. But when the Fœtus is known to be certainly dead, I prefer my common Hooks (*Fig.* 16 and 17.) to the *Engliſh* Forceps: for the Forceps are ſo large, that they ſtrike a great Terror not only into the poor Patient but the Standers-by. Whereas my Hooks are ſo ſmall, that they may be eaſily concealed; and I have often extracted a Fœtus with them, when ſcarce any body has known that I have uſed a Hook, and have thought that I performed it by my Hands only. On this Account, CHAPMAN, who is otherwiſe a profeſſed Enemy to the common Hooks, yet prefers them to the Forceps for the Extraction of a dead Fœtus; and more particularly, as they often effect it in the ſhorteſt Time.

CHAP.

CHAP. CLIII.

Method of extracting a dead Fœtus.

I. WHEN the Fœtus dies in the Birth, and preſents in an ill Poſture, the exceſſive Diſorder which it gives the Mother, makes it altogether neceſſary to free her from it, either by the Hands or Inſtruments. Nor does the Difficulty proceed altogether from the ſtill Birth, though it even be in a natural Poſition: but it proceeds in part from the Mother's Weakneſs, or from her feeling few or no Pains, from there being no Motion in the Infant, whoſe Struglings, when alive, uſually prove a ſtrong Incentive to forward the Birth; and partly alſo from the Contraction of the *Os Uteri* and *Vagina* after the Time of its Relaxation has been neglected. But before the Midwife proceeds to the Extraction, it is firſt highly neceſſary to be aſſured, whether the Infant is abſolutely dead or alive, that it may not be ignorantly killed in the Operation. And this is the more neceſſary, becauſe the Generality of Signs, which are uſually propoſed to diſtinguiſh, whether it be dead or alive in the Uterus, are uncertain and fallacious, eſpecially when the Fœtus preſents either its Shoulders, Buttocks, Back, or either Side of its Head, to the *Os Uteri*; becauſe thoſe Parts afford very obſcure and uncertain Signs, whether it be alive or dead. Extraction of a dead Fœtus often neceſſary.

II. The principal Signs of the Fœtus being dead are the following: 1. If the Mother feels no Motion in the Fœtus ſome Time after ſhe has left her Labour-pains, but rather a heavy and ſluggiſh Weight in her Belly, which ſhifts to that Side on which ſhe turns herſelf. 2. If ſhe is ſeized with Shiverings, fainting Fits, and a Teneſmus. 3. If her Breath ſtinks violently; and, 4. When Matter of a cadaverous Smell flows out of the Uterus. 5. The Abdomen at the ſame Time ſeeming cold to the Touch. Another Sign, which is looked upon by ſome as an infallible Indication of a dead Fœtus is, when the Meconium, or black Fæces of it, are diſcharged through the Vagina: though I muſt acknowledge, that I have frequently obſerved this laſt Appearance when the Fœtus has not been dead. And, to ſay the Truth freely, I have been induced, by all the preceding Signs, to believe the Infant dead, and to extract it as ſuch, when I have been afterwards convinced that it was alive. It is therefore, in my Opinion, a more manifeſt and certain Indication of a dead Fœtus, when the Navel-ſtring or Placenta, being touched, (when that is practicable) appear cold, and without any Pulſation of the Arteries; as alſo when there can be no Pulſe felt in the Carpus and Ancle, and eſpecially if the Cuticle eaſily peels off at the ſame Time: and, laſtly, it is a pretty ſure Sign of its being dead, if no Pulſation can be felt in the Bregma or Fontanel, when it preſents in its natural Poſture, appearing rather depreſſed and flaxid, than throbbing to the Touch. However, we ſhould be cautious not immediately to imagine, that the Fœtus, which is without this Pulſation in the Fontanel and Arteries, is therefore dead; for the Motion in thoſe Parts is ſometimes ſo ſmall in weak Infants, as to be imperceptible to the Finger. Indeed the Sign taken from the peeling off of the Cuticle is more certain. If, therefore, the Infant appears to be really Signs of a dead Fœtus.

dead, and the Waters are already discharged, it should be extracted with all possible Expedition, lest, by its Putrefaction in the Womb, it might occasion a most malignant Fever, and even the Death of the Mother. But if the Fœtus dies before its true Time of Birth, the Waters not being discharged, (which is indicated by the Motion of the Fœtus gradually lessening, and the Swelling of the Belly subsiding) it may, in that Case, remain in the Uterus without putrifying for the space of several Weeks, or even Months; of which I had formerly an Instance [a]. And therefore, if the Patient is well in all other Respects, it may be better to wait till we have some Call from Nature, than to procure an untimely Exclusion of it, either by Medicines, the Hands, or Instruments.

When the dead Fœtus presents itself rightly.

III. If the Infant dies in the Birth, and at the same Time presents in a natural Position, we are not immediately to fall to work upon it with Instruments, before we are certain of its Decease; but the Mother should be assisted in her Endeavours, to exclude it naturally by proper Medicines, particularly strong Clysters, which are frequently very serviceable in promoting the Throws of the Mother, and the Exclusion of the Fœtus. We must be very cautious at the same Time not to be too free with these warm and forcing Medicines, lest we thereby bring on either a violent Fever, or a dangerous Hæmorrhage. But if these prove insufficient, it may be extracted by the Hands [b] before it begins to putrify. That the Operator may then succeed the better, the Mother should first void her Urine as if the Fœtus was alive: but if she cannot of herself make water, because the Head of the Infant compresses the Neck of her Bladder, it should then be drawn off by the Catheter represented in *Tab.* XXVII. *Fig.* 1. to 5: which done, she may be placed either in the Chair, *Tab.* XXXIII. *Fig.* 15. or else upon a Bed, as we have before directed in § VIII, and XIV. of the preceding Chapter. After which, the Infant is to be extracted, by applying both Hands to its Head, or else by the Feet, as we have described in the foregoing Chapter. It may be also not amiss to attempt its Extraction by passing a broad Ligature about its Neck, as DEVENTER advises before the Application of Hooks, which are less safe. If this does not succeed, we may try either PALFYN's Hooks, Plate XXXIII. *Fig.* 16. or the *English* Forceps, Plate XXXIX. These Forceps must first be disjoined at the Hinge, and each of them applied cautiously to each Side of the Head, to compress it gently, and then extract it. The Hooks proper for this Purpose should be well polished; Figures of which have been given by several Authors, and may be seen in *Tab.* XXXIII. *Fig.* 17, 18, and 21. These are to be prudently fastened into some convenient Part of the Infant's Head, as the Eye, Ear, Mouth, and sometimes the Forehead and Occiput together, thereby extracting the Fœtus downward against the Rectum: and, if those Instruments are not at Hand, a large Nail may be bent into a Hook, and applied as we observed in Sect. XXI. of the preceding

[a] I remember a Case of this Nature, in which the Mother retained a dead Fœtus for two whole Months without any Detriment, till at length she fell in Labour, and discharged her Burthen without any Difficulty. More such Instances occur in Authors.

[b] That this is one of the most antient Operations, may appear from HIPPOCRATES's Book, *de Morb. Mulier.* and especially from his professed Treatise *de Fœtus Extractione.* See FONTANI *Libellus de Fœtus Extractione* per Uncum.

Chapter.

Chapter. But Celsus, who, in my Opinion, ſeems to have been well verſed in theſe Matters, prudently adviſes not to extract the Fœtus at any Time indiſcriminately: for, ſays he, "if it be attempted when the Parts are contracted ſo "as not to give way to the Fœtus, the latter will be not only pulled to pie-"ces, but the Parts themſelves will be alſo injured by the Point of the Hook; "and therefore when the Parts are contracted, that is, when the Pains ceaſe, the "Operator ſhould deſiſt, and repeat his Extraction when they come on again." Laſtly, Celsus directs the Hook to be drawn with the right Hand, while the left guides it, and holds the Fœtus. But if the Infant's Head is ſo large, or obliquely ſituated, that it cannot be drawn through the Vagina whole, an Opening may then be made in the Fontanel, or other Part of the Head, and the Brain thereby extracted, that the remaining Part may collapſe, and be more eaſily extracted by one or both Hands. The celebrated Profeſſor of Midwifery, Mauriceau, in his Treatiſe upon that Subject, furniſhes us with a particular Inſtrument both for opening and holding the Head, which he calls *Tire-tête*, and highly extolls it, as having frequently experienced the Advantage of it. But this complex Inſtrument is, in my Opinion, not ſo very neceſſary, as the Buſineſs may be eaſily performed by the ſimple Hooks repreſented *Fig.* 17 and 18. or elſe when the Brain is extracted, it may be very well drawn out, even by a crooked Nail, or the Hand only.

When the dead Fœtus lies in an unnatural Poſture.

IV. But if the dead Fœtus preſents in an unnatural Poſition, we are then to turn it, and extract it by the Feet as Celsus has adviſed: and this much in the ſame Manner as we have before directed for unnatural Poſtures of the live Infant; but with a little more Caution, eſpecially if the Fœtus is begun to putrify, leſt it ſhould be pulled to pieces, and the Head left behind in the Uterus, which cannot then be eaſily extracted, becauſe the *Os Uteri* contracts itſelf. For if it is retained, and putrified in the Uterus, it excites the moſt malignant Symptoms, and frequently even kills the Mother, if it be not ſpeedily extracted.

When the Head is left behind after extracting the Body.

V. As the Head is not eaſily extracted, both upon the Account of its round Figure and Lubricity ſlipping through the Fingers, it may be adviſeable, when the Head is thus left behind, to attempt its Extraction by thruſting the Finger into the Mouth, or the *Foramen magnum* of the *Os occipitale*; by which means I myſelf happily extracted the Head of an Infant without Inſtruments. But if the Fingers are not ſufficient for this Office, a Piece of Linen may be paſſed into the Uterus, about an Ell long, and four Fingers Breadth, which being paſſed round the Head, and faſtened into a Loop for the Hand, the Extraction may be thereby made very commodiouſly. Others recommend an Inſtrument for this Purpoſe, which is to be fixed into the Mouth, Noſe, Occiput, or other Part, paſſing the left Hand into the Vagina to guide the Hook, and to prevent it from injuring the Parts, as we before obſerved from Celsus in Sect. III. But notwithſtanding, if it proves too large to be drawn out by theſe Means, it may be then opened, the Brain extracted, and the remainder performed either by the Hands alone or proper Inſtruments. The large Forceps for extracting the Stone from the Bladder, or that deſcribed in Plate XXXIX may be very ſerviceable here. The celebrated Amyand in this Caſe uſes a kind of Net or Bag, in which he includes the Head, and afterwards extracts it without injuring the Parts by

Inſtruments. But this ſeems to me more difficult, or leſs practicable than the preceding Methods.

The Arm hanging out of the Uterus.

VI. Sometimes the Arm of a dead Fœtus hangs out of the Uterus in ſuch a Manner, that it neither can, nor ought to be returned. But when it affords the certain Signs of Death, by appearing black or livid, cold and without Pulſe, the Cuticle ſeparating as we before obſerved, attended with a cadaverous Smell, the Midwife is then to endeavour to turn the Feet, and thereby extract it as if it were alive. But if, from the Largeneſs of the Arm, or the too great Stricture of the Uterus, her Hand cannot be paſſed, which ſeldom happens, it will then be neceſſary either to twiſt or cut off the Infant's Arm near the Shoulder. Before it is thus cut off, it will be more convenient to twiſt and extend the Arm ſeveral Times one Way: by which means the Ligaments, being partly extended and partly lacerated, may be more eaſily and ſecurely cut through; but, to prevent the Point of the Knife from injuring the Mother, it will be proper to uſe the Scalpel armed with a Button, repreſented in *Tab.* V. *Fig.* 4 and 5. which I have ſometimes uſed with Succeſs. When the Infant's Arm has been thereby removed, the Hand may be then paſſed to turn and extract it by the Feet.

The Uſe of Hooks, eſpecially of my own.

VII. Sometimes the Shoulders are held ſo faſt in the Neck of the Uterus, either by its Contraction or the croſs Poſition of the Fœtus, that the Hand can neither paſs, nor alter the Poſition thereof without Danger of lacerating the Uterus[a], by exerting too great a Force; in which Caſe there is no Poſſibility of laying hold of the Feet by the Hand. I therefore here think it adviſeable with Celsus, to open[b] the Thorax and Abdomen of the Infant, either with the Finger, Sciſſars, or a Hook, *Tab.* XXXIII. *Fig.* 17 and 18. and, after extracting the Viſcera and Inteſtines, to try if the Feet cannot, by this Diminution, be more eaſily come at, and the Fœtus thereby extracted, which has generally ſucceeded with me when I have tried this Method. But if notwithſtanding the Parts remain contracted, and the Feet concealed, or out of reach, then the Nates are to be extracted by paſſing the Hand under them, and the Hook into their upper Part, after which the Trunk and Head will follow of themſelves; but frequently not without leaving ſome Parts behind[c]. But to avoid injuring the

[a] That the Uterus may be ſometimes burſt in the Delivery, I am convinced from the Experience of myſelf, and the Obſervations of others; ſee Stalpart Vander Wiel *Obſ. &c.* and our Diſſertation *de Fœtu ex Utero matris mature excidendo*.

[b] There are indeed ſome, who boaſt they can always deliver the Fœtus without the Uſe of Inſtruments, and alſo reflect with Severity upon thoſe, who, in difficult Caſes, apply them. Such are chiefly Viardellus, Deventer, and La Motte: when, at the ſame Time, we find Inſtances in the Treatiſes of the two laſt, where they were obliged to have Recourſe to Inſtruments when both their Hands were inſufficient.

[c] Viardellus, who endeavours to diſcard or reject the Uſe of Inſtruments for extracting a dead Fœtus, in Confirmation of his Doctrine, alledges a Caſe, wherein the Head of a dead Fœtus ſtuck ſo faſt in the Vagina, as to put him to the greateſt Difficulties; which, however, he at laſt extracted, after an Hour's Fatigue, with both his Hands. But the Conſequence was, that the Mother died ſoon after with a Mortification of the Parts; whereas, if a proper Hook had been timely and ſkilfully fixed in the Head, or its Brains ſcooped out, it might then have been extracted in a few Minutes, with Eaſe both to the Patient and Operator, and the Mother poſſibly by that means preſerved from the bad Effects which muſt neceſſarily follow from the Contuſion, or Violence and Injuries offered to the Parts by the Hands, which are much too bulky, conſidering the ſmall Capacity and Stricture of the Parts.

Uterus,

Uterus, in introducing the Hook for this Purpoſe, it may be proper to have its Handle made with Notches, as in *Tab.* XXXIII. *Fig.* 19. that, by feeling with the Finger, we may be able to judge of the Poſition in which the Inſtrument is to be directed in the Uterus, ſo as to enter the Fœtus without injuring any other Part. Without which Precaution both the Bladder and Uterus have been very often dangerouſly wounded, which might have been avoided by this Artifice, as I have frequently myſelf experienced. Another Advantage in the Handle of this Inſtrument is, that when one of my Hands proves not ſtrong enough to make the Extraction, the other Hand being engaged with the Fœtus *in Utero*, I faſten a ſtrong Ligature about the Neck of it, marked *b b*, whereby the Midwife, or any other Aſſiſtant, may alſo draw while my own Hand guides, and partly alſo extracts the Handle, which is an Advantage not to be found in common cylindrical Handles.

VIII. They alſo act with Reaſon, in my Opinion, who prefer and uſe the large Forceps, which we have before deſcribed, in *Tab.* XXVIII. for extracting the Stone, as much better than any Hooks, or other Inſtruments, not only becauſe they are leſs apt to injure the Uterus, but alſo as they may be more eaſily held in the Hand of the Surgeon; though at the ſame Time there is no leſs Caution neceſſary in the Uſe of theſe, than of other Inſtruments, in order to avoid pinching and lacerating the Mouth, or any other Part of the Uterus. Uſe of the Forceps.

IX. Hoorn has ſtill another ſhorter Method of his own for extracting the dead Fœtus when its Arm is fettered in the Vagina, which conſiſts in dividing the Neck from the reſt of the Body either with a Hook or an obtuſe-pointed Scalpel, when there is not Room enough for the Hand to paſs to its Feet. After this the Fœtus comes forth with little or no Trouble, the Operator drawing it only by the Hand, and the Head may then be afterwards extracted, either by the Hand alone, or the Artifices before propoſed. Agreeable to which we find Celsus directing the ſame Method in the ſame Caſe, where he ſays, "When the "Fœtus preſents in a tranſverſe Poſture (much in the Manner as in *Tab.* "XXXIII. *Fig.* 8 and 10.) the Remedy is then to cut off the Neck, that the "Parts may be extracted ſeparately." Hoorn's Method of Extraction.

X. Though I am not altogether againſt the Uſe of Inſtruments when really neceſſary, yet I would not adviſe them but in deſperate Caſes, where there are no Hopes left of a Delivery by the Hand and Medicines. Therefore every prudent Midwife ought to be well aſſured, that the Infant is dead before any Inſtruments are applied: otherwiſe it would be reaſonably deemed a raſh Action in any Operator to extract the Fœtus, by pulling it to pieces before it is dead, except there be ſome particular and important Reaſons, as when the Mother's Life is in the utmoſt Danger, and will be inevitably loſt through Weakneſs, if the Birth be delayed any longer. In this Caſe I muſt needs think it may be done with a ſafe Conſcience [a], as well as with the Conſent of the moſt learned Prelates of the *Lutheran* Church, notwithſtanding the Doctors of the Church of *Rome* will not allow of it, as we before obſerved in our Chapter upon the *Cæſarean* Section. Yet the moſt experienced Surgeons have been ſometimes A Caution concerning the Uſe of Inſtruments.

[a] See *Chap.* CXIII. preceding on the *Cæſarean* Section.

miſtaken,

miſtaken, and extracted the Fœtus either alive, or not quite dead, when themſelves, the Mother, and Aſſiſtants, all of them believed it had expired. It is therefore no wonder, that CELSUS reckons the Buſineſs of delivering the Infant from the Womb to be one of the moſt intricate, dangerous, and difficult Operations, requiring the greateſt Judgment and Caution. However, when the Fœtus appears to be alive, and the Mother's Strength ſtill continues, no Inſtrument ſhould be paſſed to extract it. And as for the *Specula Uteri* propoſed and deſcribed by ALBUCASIS, SCULTETUS, MAURICEAU, and others, I am ſo far from thinking them uſeful and neceſſary, that I muſt rather, with many of our modern Phyſicians and Surgeons, judge them to be pernicious, and apt to injure the Parts.

CHAP. CLIV.

Of profuſe Hæmorrhages *or Floodings of the* Uterus *in Women with Child.*

Cauſe of the Diſorder.

I. SOMETIMES Women with Child, eſpecially thoſe who are near their Time, have a more or leſs copious Diſcharge of Blood from the Uterus, which is different from the Menſes, becauſe it happens in Women who are pregnant. Sometimes this Flux proceeds, eſpecially in the firſt Months, from the Patients being too full of Blood, unattended with Weakneſs or any other bad Conſequence, and more particularly if it coincides with thoſe Times of the Moon, when the Menſes uſe to flow: this Redundancy is evacuated by a Rupture of the Blood-veſſels of the Vagina and Uterus, and thoſe which communicate with the Membrane of the *Chorion*, from whence a milder Hæmorrhage; or with the Placenta, whoſe Diſcharge is more copious. But very often in the laſt Months the Hæmorrhage proceeds from a total or partial Separation of the Placenta, (which is very dangerous) occaſioned by ſome external Violence, as a Fall, Leap, Blow, *&c.* or from too great a Redundancy of Blood; to which ſome of the Moderns add an Adheſion of the Placenta to the Mouth of the Uterus, which ſeparates when that Part relaxes itſelf at the Time of Delivery, ſo that the more the *Os Uteri* is dilated, the greater Separation is made of the Placenta[a]: and conſequently a greater Hæmorrhage follows, ſometimes ſo profuſe as greatly to weaken the Mother, if not to endanger her Life; and if the Fœtus be not timely extracted with the Hand before fainting Fits, *&c.* come on, both it and the Mother cannot long ſurvive[b].

Diagnoſis and Prognoſis.

II. This Diſorder is ſufficiently apparent from the Relation of the Mother, and from inſpecting the Flux of Blood this way diſcharged; but whether it proceeds from the Vagina only, or from the Uterus, cannot well be determined

[a] See BRUNNERI *Diſſ. de Part. p. n. ob ſitum placentæ ſuper orificium internum Uteri*, Argentorat. 1730. and STUART's Diſſ. *de Secundinis*, Anno 1737.

[b] There was a Woman ſome Years ago near her Time at *Helmſtadt*, who was taken with a profuſe Bleeding from her Womb, without any manifeſt Cauſe, of which ſhe expired in an Hour's Time, notwithſtanding ſhe had the immediate Aſſiſtance of an expert Midwife. But the Huſband not permitting me to open her, I could neither ſave the Fœtus, nor diſcover the Cauſe.

but

but by ſearching with the Finger up to the *Os Uteri*. For if, upon paſſing the Finger into the Vagina, the *Os Uteri* is found ſhut, the Flux then proceeds from the Vagina only, and the Quantity diſcharged is uſually not immoderate. But if, on the contrary, the Hæmorrhage is profuſe, the *Os Uteri* appears relaxed, and the Finger perceives the ſpungy Subſtance of the Placenta inſtead of the Infant's Head, it then denotes, that the Flux proceeds from the Uterus by a Separation of the Placenta, which is a Caſe much more dangerous than the former. This Caſe is generally attended with a Tenſion and Inflation of the Hypochondria, violent Pains in the Belly and Loins, Paleneſs and Languor. The larger the Hæmorrhage, the more dangerous; and, if ſpeedy Aſſiſtance be not given to the Mother and Infant, when fainting Fits approach, the Lives of both are in the utmoſt Danger. But if the Mother's Hands are cold, and her Eyes look dim, her Pulſe becomes weak, attended with a cold Sweat and Convulſions, which are the uſual Conſequences of a very profuſe Bleeding, we may then reaſonably conclude there are no Hopes, but Death is at hand; and that therefore it is better for the Operator to do nothing, leſt he ſhould be cenſured by the ignorant, as being acceſſary to her Death.

III. When this Diſorder proceeds from too great Fulneſs, violent Heat, or Commotion of the Blood, it may be generally remedied by Bleeding in the Arm, exhibiting [a] cooling and aſtringent Medicines, with a little of *Maſſ. Pil. de Cynogloſ.* and recommending the Patient to a proper Diet and Reſt both of Body and Mind. But if the Flux is very large, proceeding from the Uterus itſelf, and not yielding to the means before propoſed in that Caſe, the Separation of the Placenta uſually occaſions it. There is then no other Remedy left but to extract the Fœtus and Secundines with the Hand, becauſe the ruptured Veſſels of the Uterus cannot contract themſelves ſo long as they are diſtended by the Fœtus, and its Appendages. Therefore Medicines proving uſeleſs, the only Remedy is a dextrous Extraction of the Fœtus with the Hand in the following Manner: Treatment.

IV. In the firſt Place, the Mother is to be laid in a convenient Poſture upon a Bed with her Hips elevated, her Legs opened, *&c.* as we have before directed in difficult Labours, *Chap.* CLII, CLIII. This done, if in the firſt Months, the Fœtus being yet ſmall, two Fingers dipt in Oil, and gently introduced into the Uterus, are generally ſufficient to extract the Fœtus either alone or with the Secundines: and this is called an Abortion. But if in the laſt Months, the Operator then paſſes his Hand, lubricated with Oil or Butter, through the Vagina to the *Os Uteri*, which if not ſufficiently open of itſelf, he may then moderately dilate it with one, two, or more of his Fingers, till it will admit his whole Hand, which cannot eaſily be done, when the Placenta adheres to this Part. In this Caſe the Operator muſt gently ſeparate it with his Fingers, where it adheres with the leaſt Force, obſerving not to ſeparate more of the Placenta than will make way for his Hand, to avoid a more profuſe Hæmorrhage, and the Death of the Patient. If the Placenta obſtructs the *Os* Manner of extracting the Fœtus.

[a] Such as *Pulv. antiſpam. vel temperant. c. ſpec. de hyacinth. & pauco opio.* Spring-water impregnated with Nitre or an Acid; or *Aq. Burſ. Paſtoris cum Syr. Corall.* or *Decoct. Citrat. Myrſichti* for her common Drink. Externally, a Cataplaſm of red Wine applied almoſt cold, or *Oxycrate.*

Uteri after it has been ſeparated, in that Caſe HOORN extracts it firſt, and the Fœtus afterwards; for in this Caſe there ought not to be any Delays. And therefore the Hand is to be immediately paſſed into the Uterus, to extract the Infant by its Feet, in order to preſerve the Mother, though perhaps the former is immature. But as the Membranes of the Fœtus remain ſometimes entire, in order to lay hold of the Infant's Feet, they may be divided by the Finger-nails, or a Hook, as we obſerved in the preceding Chapter. This is done more eaſily, when the Feet preſent firſt. But if the Head, it is much more difficult, as it can ſcarce be held firm enough on Account of its Lubricity, and the Feet in this Caſe lying uppermoſt are not ſo eaſily found: however, they muſt be ſearched for with the utmoſt Diligence, turning the Head aſide, and the Fœtus be extracted by them.

V. The Fœtus thus extracted, the Secundines uſually follow of themſelves, as being in this Caſe already ſeparated from the Uterus; and, if there ſhould remain any Adheſions, they are to be gently freed with the Hand before the Extraction. Which being performed, and the concreted Blood drawn out, to prevent it from occaſioning any After-pains, the Veſſels will contract themſelves, and the Flux of Blood gradually diminiſh, eſpecially with the Aſſiſtance of proper external and internal Medicines, and Reſt. In the mean Time, the Patient being greatly weakened by ſo conſiderable a Loſs of Blood, ſhe ſhould be treated with a reſtorative Diet and Medicines, as we before directed in violent Hæmorrhages; particularly warm Suppings, as Broth, Milk, Jellies, Almond-emulſion, and the common Ale-cordial. And if, by this means, the Mother ſurvives ſix Hours after, ſhe generally recovers; the Hæmorrhage ceaſes, and ſhe regains new Strength from thoſe thin Aliments. So that, in Caſes of this Nature, the Extraction of the Fœtus ſhould not be deferred till the Mother falls into Fainting-fits; for, by ſuch Neglect, I have know many who have periſhed in the Flower of their Age. For Examples, the Reader may conſult MAURICEAU *Obſ.* 89. and his Index under the Title of our preſent Subject.

Puzos's Opinion.

VI. The modern Writers on this Subject maintain, that in theſe Caſes no Advantage is to be expected from the Labour-pains, (which would exclude Blood only inſtead of the Fœtus) but from the Hand alone, for the Extraction of the Infant. I myſelf was formerly of this Opinion. But PUZOS, in the Memoirs of the Royal Academy at *Paris*, aſſerts that theſe Pains are ſo far from being noxious, that he has found them very ſerviceable, if the Surgeon knows how to make a proper Uſe of them. He has therefore propoſed the following Method, by which in theſe Caſes both the Mother and Infant may generally be preſerved. He obſerves, that in the firſt and latter Part of her Time, the Patient is more ſubject to Flooding than in the intermediate Seaſon; which he accounts for: but that in the laſt Months they are infinitely more dangerous, as they generally ariſe from a Separation of the Placenta from the Uterus. He firſt ſhews that they may be frequently remedied by Bleeding, by cooling Medicines, by Reſt and a proper Diet. That if theſe prove inſufficient, we muſt proceed immediately to exclude the Fœtus, for its own and the Mother's Preſervation; but not by the violent Methods deſcribed above. But, as he had obſerved that Women labouring under Floodings, if they had very

ſtrong

ſtrong Pains, generally eſcaped, and were delivered with Succeſs; he choſe prudently to imitate Nature, and, where the Pains were deficient, to ſtimulate and excite them. Therefore, when his Patient was ſeized with a Flooding in the laſt Months, and the Labour-pains went off, he quickened them ſo, that, by the Aſſiſtance of one Finger or more, he gently dilated the *Os Uteri*; by which Means it opened itſelf more and more gradually, and the Waters were in ſome meaſure formed. He then burſt the Membranes for the Diſcharge of the Waters; after which the Uterus and its Veſſels contracted themſelves, the Hæmorrhage decreaſed, and the Infant's Head was protruded towards the *Os Uteri*. Then by continuing the gentle Dilatation with his Fingers, and ſtill promoting the Pains, the Birth ſoon followed, and the Mother and Fœtus were both happily preſerved, who had both probably periſhed in the natural Way, and by the too violent Method of Extraction. And this Practice our Author confirms and illuſtrates with various Obſervations. But if by this Means the Mother and Infant cannot both be ſaved, through the great Weakneſs of the Patient; yet, by following the Rules here laid down, the Fœtus may be extracted after the uſual Method with much greater Eaſe, and leſs Inconvenience and Pain to the Mother.

CHAP. CLV.

The Method of extracting the Secundines.

1. THE After-burden, or Secundines, was ſo termed by the Ancients, as coming in the ſecond Place after the Fœtus: theſe are the Navel-ſtring, Placenta, and Membranes including the Fœtus, *viz.* the Chorion and Amnios, which are generally excluded together, I ſay generally, becauſe ſometimes a part of the Membranes adheres to the Uterus after the Placenta has been extracted, and, by putrifying there, excites malignant Symptoms. The Secundines generally ſeparate from the Womb ſpontaneouſly after the Infant has been delivered, or at leaſt they are uſually freed and excluded by the Aſſiſtance of the Mother's Throws. However, if they ſhould adhere to, and remain in the Uterus after the Birth, either from their Largeneſs, a Laceration of the Navel-ſtring, or a too ſtrict Coheſion, it will then be proper to ſeparate and extract them with the Hand, leſt the *Os Uteri* ſhould contract and retain them, and, by putrifying in the Womb, they might occaſion moſt malignant Fevers, Pains, profuſe Bleeding, and even Death itſelf[a]. But before we attempt an Extraction of the Secundines it is highly neceſſary to ſearch in the Womb, to ſee if there be another Fœtus, or perhaps more. For in this Caſe by a premature Extraction you may occaſion a violent Hæmorrhage, and deſtroy both the Mother and the remaining Infants. Thoſe that remain muſt be firſt extracted by the Feet, and laſt of all the Secundines. I am not indeed ignorant, that it is the Opinion of many, the Secundines need never be extracted with the Hand, be-

When their Separation is eaſy.

[a] As hath been obſerved by TULPIUS *Lib.* 4. *Obſ.* 42. MAURICEAU *in Obſ.* & COHAUSEN *Lucina Ruyſchiana*, where there are many Inſtances collected together from Writers.

cauſe they generally ſeparate either of their own Accord, or putrify, and come away after a few Days or Weeks[a]. But I think their Opinion the ſafeſt, who approve of timely extracting them with the Hand, when they do not immediately follow the Infant, as is adviſed by HIPPOCRATES, CELSUS, and the major Part of our modern Phyſicians; and this the rather, becauſe we are furniſhed with many Inſtances of dreadful Symptoms which have followed a Neglect hereof, ſuch as violent Pains, Floodings, malignant Fevers, and Death itſelf. It is therefore moſt adviſeable to extract them as ſoon as poſſible immediately after the Birth of the Infant, while the *Os Uteri* remains open, and freely admits the right Hand, which is to be guided by the Navel-ſtring held in the left till it arrives at the Placenta, which is to be gently freed from the Uterus by the Fingers, and then extracted[b]. But if it adheres more ſtrongly than uſual, it will be neceſſary to tie the Navel-ſtring, and cut it off near the Infant, and, winding it round the Fingers of the left Hand, to pull it moderately in various Directions, while the right Hand is freeing it from the Womb, as we have repreſented in *Tab.* XXXIII. *Fig.* 9. But if all this is not ſufficient, it may be proper to rub the Patient's Abdomen with one Hand, or to direct another to do it, adviſing the Mother to cough and ſtrain, in order to promote its Excluſion, which ſeldom reſiſts theſe means. Care ſhould be taken not to draw the Navel-ſtring and Placenta too violently, for fear of inverting, or even extracting the Uterus, which has been done by ſome ignorant Midwives, to the Hazard of the Patient's Life[c]. Laſtly, when the Placenta has been thus extracted, it may be proper, as CELSUS adviſes, to paſs the Hand again into the Uterus, in order to free it from the grumous Blood, or any Pieces of the Secundines, which may be left behind, and might prove the Cauſe of violent Pains, Floodings, *&c.* It may be alſo not amiſs to continue the Hand doubled in the Uterus for ſome Time, that it may more equally contract itſelf, whereby many bad Symptoms may be prevented.

When the Secundines adhere firmly.

II. If the Placenta ſhould adhere ſo ſtrongly as not to give way to the ſeveral means before propoſed, it will be neceſſary to ſeparate it gradually with the Fingers from the Uterus: which may be generally done without any great Difficulty, when any Part of it is looſened, and the Thumb being applied in its Center, the Fingers are extended to its Sides, and gradually inſinuate between it and the Uterus. But if it will not eaſily ſeparate in this Manner, we are notwithſtanding to endeavour at it, eſpecially with the Thumb and two firſt Fingers; and, if they fail, it may be bored through in its Middle by the Fingers, and by that means ſeparated, but with Caution, to avoid injuring the Uterus by the Finger-Nails, or any Violence, which might invert it. For, it is certain, there are many Caſes in which the Placenta adheres ſo firmly to the Uterus,

[a] This Opinion was countenanced by RUYSCH towards the latter Part of his Life, in a Treatiſe at *Amſterdam, de Uteri Placenta*, Ann. 1725.

[b] There are ſome who affirm, the Ancients were ignorant of this Method of extracting the *Secundines*; but whoever peruſes *Lib.* VII. *Cap.* 29. of CELSUS, will perceive, that he was both well acquainted therewith, and has alſo given us an accurate Deſcription of the ſame.

[c] Many adviſe only to draw the Navel-ſtring till the *Placenta* follows, which is a Method very hazardous, to riſque the breaking of the Cord, whereby the Extraction would be rendered much more difficult; and therefore it is more adviſeable to paſs the Hand thereby to the *Placenta* itſelf.

that it cannot be extracted without a conſiderable Force, as I have myſelf experienced; and PAREY mentions a Caſe in which the Placenta could not be extracted by any Art: In many of which Caſes a violent Separation of the Placenta frequently proves fatal to the Mother, according to the Obſervation of various Writers. If therefore the Placenta will not give way but to great Violence by the Hand, it is better to deſiſt, and make Trial of forcing Medicines, which I have frequently known to ſucceed, particularly the *Pulv. ex arefacto Anguillæ hepate unà cum Bile, vel ex Mar. Borac, cum Aq. puleg. & Cinnam. Pil. Aloet*, &c. to which we may add a ſtimulating Clyſter, and Suppoſitory with ſternutatory Powders, which are adviſed by HIPPOCRATES. And it is better to commit the Buſineſs to Nature, aſſiſted by theſe Remedies, than violently to ſeparate or lacerate the Placenta from the Uterus by the Hand, which may be attended with the moſt malignant Symptoms and Death itſelf, as we are aſſured by many Obſervations. The like Caution ſhould be alſo uſed by the Surgeon, not to force his Hand violently into the Uterus, when its Mouth is contracted from his having been called too late. Yet, if the Midwife has neglected to extract the Secundines immediately after the Birth, as the *Os Uteri* in ſome Women continues open enough for many Hours, nay ſometimes a Day or two, to admit the Hand; a ſkilful Surgeon or Phyſician being called in, may with great Prudence attempt it, eſpecially if encouraged by the Solicitation of the Patient.

Method of Extraction when the Navel-ſtring is broke.

III. If the Navel-ſtring ſhould be broke, either through the Imprudence of the Midwife, its own Weakneſs, a Putrefaction, or any other Cauſe, it is then very difficult to lay hold of, and extract the Placenta by the Hand, for want of the String which ſhould be its Guide; ſo that thoſe who are not well verſed in theſe Matters may miſtake, and injure the Uterus, inſtead of the Placenta, which ought therefore to be carefully diſtinguiſhed from each other. In this Caſe the Patient muſt be placed in the Chair we before recommended in difficult Births, *Chap.* CLII. *Sect.* XIV. that the Surgeon may better examine the Parts, and by his Touch diſtinguiſh the Placenta from the Uterus. If a ſmall Part of the Navel-ſtring ſhould yet adhere to the Placenta, its Extraction may be thereby attempted, and often performed with leſs Difficulty: but when it is broke cloſe off from the Placenta, the latter ſhould be well diſtinguiſhed from the Uterus by its vaſcular Texture and Inequality, which may be perceived by the Fingers, as repreſented in *Tab.* XXXIII. *Fig.* 13. After which the Surgeon is gently to looſen, and ſeparate it from the Uterus with one Hand, while with the other he preſſes upon the Abdomen of the Patient, oppoſite to the Placenta, or elſe directs an Aſſiſtant to do the ſame. Laſtly, we are here to obſerve, that DEVENTER, and ſome others, affirm, that the Placenta always adheres to the Fundus of the Uterus, in which Part it therefore ought always to be ſearched for. But DE GRAAF, VAN HOORN, SLEVOGTIUS, BRUNERUS, STUART, myſelf, and others, have both aſſerted, and experienced the contrary; for ſometimes it does not adhere to the Fundus, but to the Sides of the Uterus, or to its anterior Part, from whence it ſhould be gently ſeparated and extracted, as before. When extracted, a ſtrict Enquiry ſhould be always made, whether it be entire or whole, that, if not, the Re-

mainder may be afterwards ſearched for, and extracted together with the grumous Blood.

RUYSCH's Opinion on this Head.

IV. I cannot, in this Place, omit the Opinion of the celebrated RUYSCH, who has publiſhed a profeſſed Diſſertation upon our preſent Subject; in which he attributes a kind of orbicular Muſcle to the *Fundus Uteri*, whoſe Office is to exclude the Placenta, which Muſcle can generally perform its Office without the Aſſiſtance of Art. So that if the Placenta does not eaſily follow the Hand, by gently drawing, he thinks it adviſeable to leave it to Nature and the Action of this Muſcle; and the rather, becauſe himſelf, being a Phyſician of ample Experience, and ninety Years old, had always found, that ſeparating the Placenta by the Hands, not only occaſioned the moſt malignant Symptoms, but alſo frequently the Death of the Mother: whereas Thoſe, in whom this Buſineſs had been left to Nature, generally recovered, the Expulſion being happily effected by Nature only. He therefore lays it down as a neceſſary Caution, never too raſhly to introduce the Hand into the Uterus, and forcibly ſeparate the Placenta. Though I do not altogether diſſent from the Opinion of this celebrated Phyſician; yet I muſt own, in Conjunction with many others, that we are furniſhed with not a few Inſtances, where the Mother has expired [a] from a Retention of the After-burthen; and therefore I am firmly perſwaded, that RUYSCH does not intend to forbid an Extraction of the Secundines in all Caſes, but only where it cannot be performed but with Violence, which is alſo apparent from his *Adverſ. Anatom. Dec.* 2. I muſt therefore give it as my Advice, never to leave the Secundines in the Uterus, nor commit their Excluſion to Nature when they may be ſeparated and extracted without Violence. But if they require an uncommon Force, or the Mother is convulſed, it is then adviſeable to defer the Operation, and aſſiſt the Mother with proper Medicines, as we have before directed, whereby they are frequently excluded without the Aſſiſtance of the Hand [b].

V. For my own Part, I would never leave an Affair of this Conſequence to Nature alone, who is often inſufficient in theſe Caſes. I have therefore adviſed, that, while the Medicines before directed are applied, the Midwife ſhould paſs gently her fore and middle Fingers through the Vagina to the *Os Uteri*; and this two or three Times a Day: and if ſhe feel any of the Secundines, extract them cautiouſly; which will be more eaſily effected, if the Patient can ſtand up againſt a Wall with her Legs diſtended. By this Means, in riſing, in ſtanding upright, and (if poſſible) walking a little with Supporters, they will recede gradually from the Womb, and deſcend to the Vagina or *Os Uteri*, ſo as to be extracted by the Midwife. And thus many have been relieved and reſtored to perfect Health, who might o herwiſe have died immediately, or at leaſt been worn out by a lingering and inveterate Diſorder. If the Secundines ſhould appear to be already putrified from neglecting to extract them, in that Caſe great Care ſhould be taken to prevent the Uterus itſelf from mortifying; in order to

[a] For Inſtances of which, the Reader may conſult LEPORINUS *de Secundinis.* COHAUSEN *in Lucina Ruyſchiana.*

[b] As it is obſerved by HIPPOCRAT. *de Morb. Mulier.* Lib. I. ÆTIUS *Tetrabibli*, Lib. IV. Serm. 4. C. 24. ÆGINETA Lib. VI. Cap. 75. PAREY *Lib. de Generat.* Cap. 18. BARTHOLIN, SOLINGEN, MAURICEAU, RUYSCH, and many more of the Moderns.

which

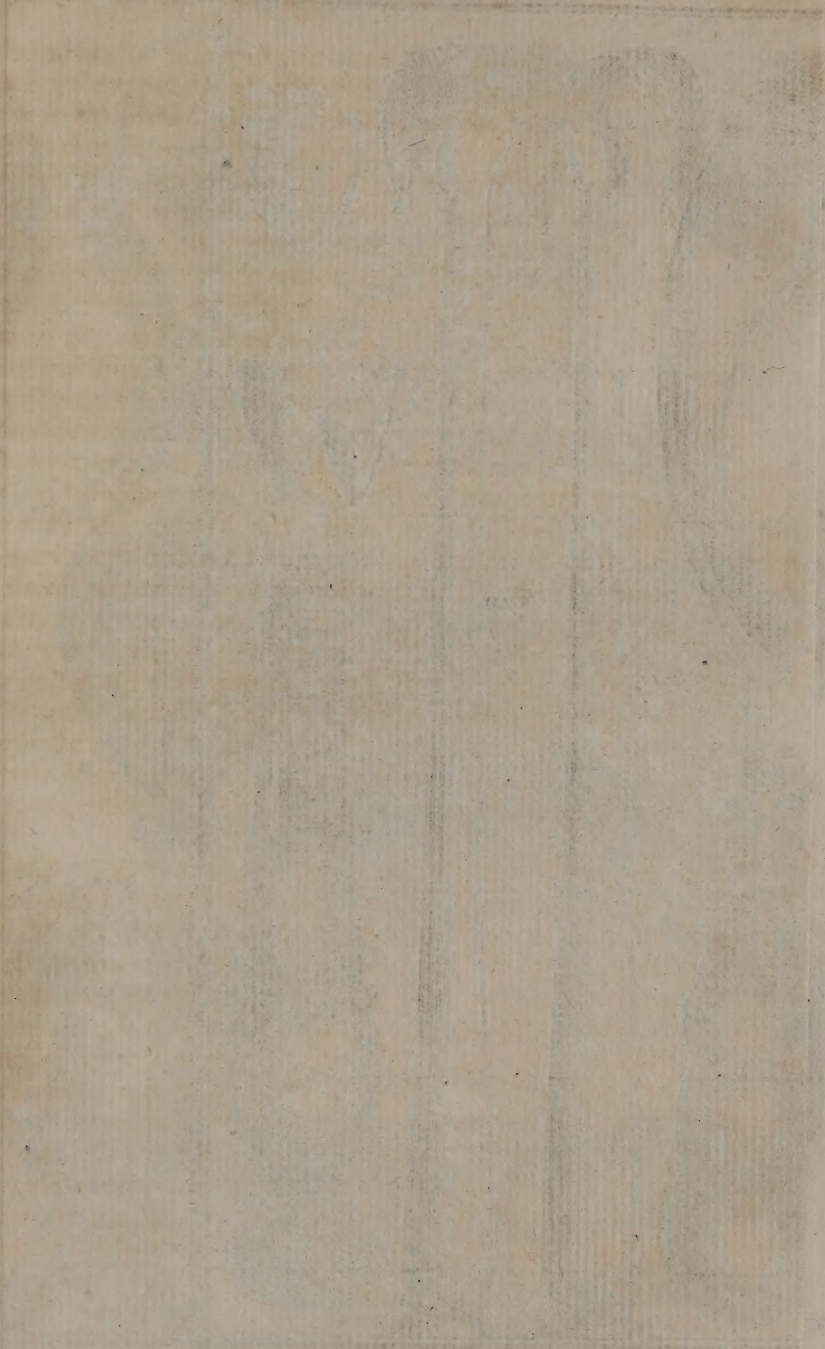


Fig.1.

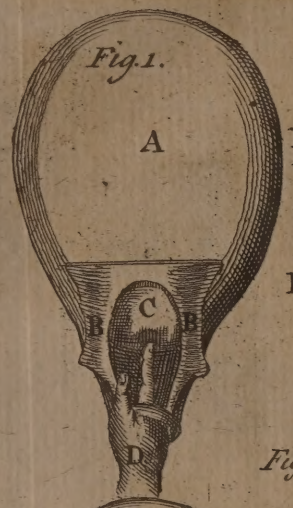


Fig.2.

Fig.3.

Fig.4.

Fig.16.

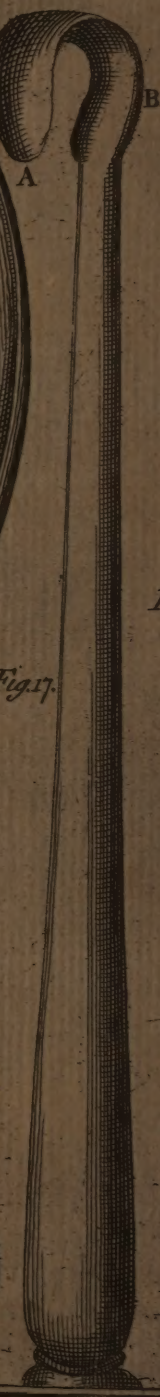


Fig.17.

Fig.18.

Fig.20.

Fig.21.

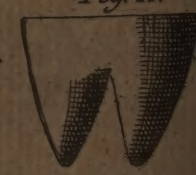


Fig.19.

Fig.5.

Fig.6.

Fig.7.

Fig.8.

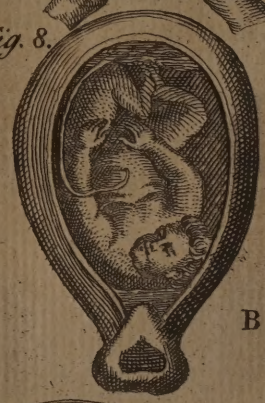


Fig.14.

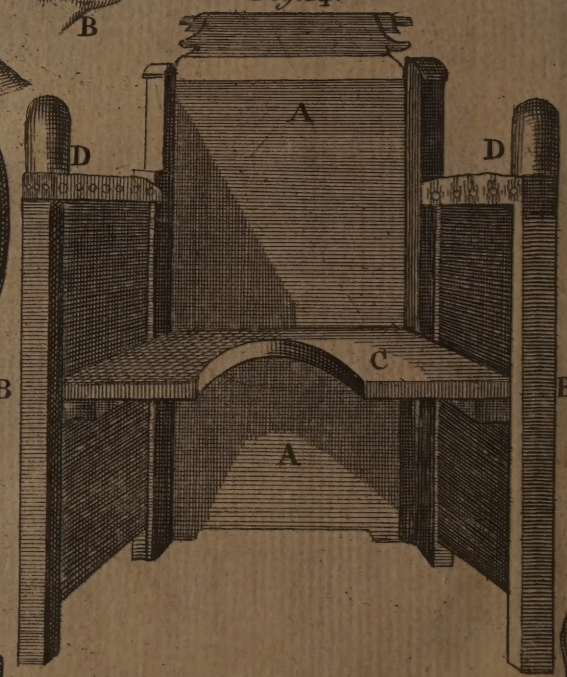


Fig.15.

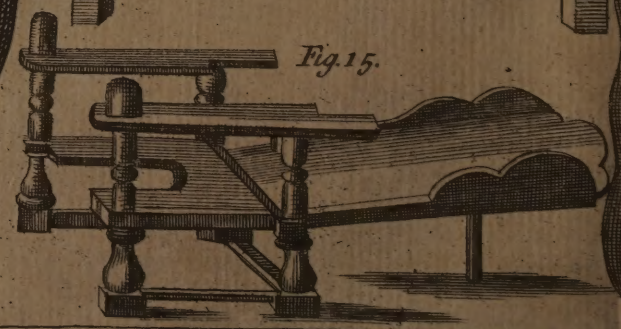


Fig.9.

Fig.10.

Fig.11.

Fig.12.

which if the corrupted Parts cannot be extracted by the Hand and Fingers, they may be brought away by injecting with a Syringe ſome vulnerary Decoction, *ex fol. Agrimon. Scord. Abſinth. cum Mel. Roſar. Elix. propriet.* &c. This Decoction may be injected ſeveral Times every Day by the Syringe repreſented in *Tab.* VI. *Fig.* 12 and 13. till all the foreign and corrupted Parts are waſhed away, at the ſame Time not neglecting the Uſe of internal Medicines proper for expelling the Secundines, together with ſtimulating Clyſters.

When retained in ſome Cell of the Uterus.

VI. If the Placenta ſhould be retained in the Uterus as in a Bag, from a ſpaſmodic Contraction of its Mouth, ſo as to make the Operator imagine it to be abſent, of which we have ſome Inſtances given us by the Moderns, the Caſe is then not without Difficulty. However, in order to extract the impriſoned Secundines, the Hand is to be guided by the Navel-ſtring to the *Os Uteri*, which is then to be gradually dilated, firſt by one, and then by inſerting the reſt of the Fingers, till the whole Hand is introduced, whereby the Placenta may be laid hold of, and extracted. If the Reader is deſirous of more upon this Head, among others, he may conſult MAURICEAU *Lib.* 2. *Cap.* 9. LA MOTTE in his *Obſ.* COHAUSEN *in Lucina Ruyſchiana*, &c.

An EXPLANATION *of the* THIRTY-THIRD PLATE.

Fig. 1. Shews the Method of examining the State of the *Os Uteri* with one or two of the Fingers to diſcern whether it be dilated, contracted, or in an oblique or ſtraight Direction; from whence the Operator may form a Judgment concerning the Delivery, whether it will come preſently, eaſily, or difficultly, *&c.* A denotes the Uterus, B B the Vagina laid open, C C the *Os Uteri internum*, as yet contracted, but in its right Situation, D repreſents the Manner of examining the *Os Uteri* with one or more of the Fingers, which, if obliquely ſituated either forwards toward the *Os Pubis*, backwards on the *Os ſacrum*, or towards either Side, denotes a difficult Delivery.

Fig. 2. Repreſents the natural Poſture of the Infant in the Birth, with its Head protruding into the *Os Uteri*, under the Arch of the *Oſſa Pubis*, A the Infant; B B the Womb laid open; C C the *Oſſa Pubis*; D D the *Oſſa Iſchii*; E E the *Oſſa Ilei*; F the Navel ſtring; G the Secundines adhering to the Womb.

Fig. 3. An Infant preſenting with its Feet foremoſt.

Fig. 4. Shews the Nates offering themſelves, and the Method of forwarding the Birth by applying the Hands to extract them.

Fig. 5. Repreſents the Fœtus in a tranſverſe Poſition, with the Hand of the Operator endeavouring to turn it.

Fig. 6. Shews the manner of apprehending the Infant's Feet, turning and extracting them.

Fig. 7. Shews the Infant in a tranſverſe Poſition, with its Abdomen towards the *Os Uteri* and Vagina; in which Poſture the Navel-ſtring often comes out, to the Hazard of the Infant's Life.

Fig. 8. Repreſents the Head obſtructed by the left Side of the *Pelvis*, and the Neck ſtrongly compreſſed by the Contraction of the Uterus; which renders the Birth extremely difficult, or impracticable.

Fig.

Fig. 9. Shews the Infant's Head inclined towards the right Side of the *Pelvis*, with the Manner of replacing it by the Hand, when the Waters have been lately diſcharged.

Fig. 10. Shews the Infant preſenting its Elbow or Shoulder to the *Os Uteri*, with the Manner of apprehending the Feet, in order to turn and extract them in this, and other unnatural Poſtures.

Fig. 11. Denotes the Manner of paſſing up the Hand, in order to turn and extract the Infant by its Feet, when its Hand and Arm hang out of the Womb.

Fig. 12. Shews the Infant with one Foot out, and the Manner of inveſtigating the other for its Extraction.

Fig. 13. Exhibits the Method of ſeparating and extracting the Placenta from the Womb, when it does not eaſily follow the Infant. There the Navel-ſtring A A is held by the left Hand B, while the right Hand D is thereby guided in the collapſed Uterus C C, to the Placenta E, which is hereby ſeparated from the Uterus.

Fig. 14. Repreſents a Chair frequently uſed among us for delivering Women: A A its Back; B B the Sides; C the Seat, having a ſemicircular Piece cut out in the middle, that the *Os Coccyx* may bend back, and the Fœtus have room to paſs out; D D the two Handles which are graſped by the Patient in each Hand.

Fig. 15. Is another Chair for the ſame Uſe, with a flexible Back, that if the Birth ſhould be preternatural it may be let down, and the Patient inclined on it as if upon a Bed, to facilitate the Delivery; but, in Defect of this Chair, a common Bed or Table may ſuffice.

Fig. 16. Gives an Idea of the broad Steel-hooks of PALFYN, for extracting a Live-Infant without Injury, when its Head ſticks in the Vagina; but their true Size is as large again as the Figure. It is neceſſary to have two of them, that one may be applied to each Side of the Head.

Fig. 17 and 18. Repreſent a lateral View of the Hooks, which I generally uſe when there is Occaſion for extracting a Fœtus. A their Points, B B their Backs.

Fig. 19. The Handle of theſe Hooks with Notches *aaaaa*, in that Part which correſponds to the Back of the Inſtrument, that, by feeling with my Thumb, I can tell how the Hook is directed out of Sight in the Womb, ſo as to avoid injuring it. And in the Groove *bb* a Ligature may be faſtened, by which the Extraction may be alſo forwarded by ſome Aſſiſtant.

Fig. 20. Repreſents a View of the anterior Part of the Point of the Hook ſeparate.

Fig. 21. Exhibits a double pronged Hook for the ſame Purpoſe.

CHAP. CLVI.

The Method of discharging Molæ, *or false Conceptions.*

I. A *Mola* is a fleshy Excrescence, or Mass, without a regular Form produced in a Uterus, either from a Concretion of the menstruous Blood, a Retention of some Part of the Secundines, or from an Ovum not properly secundated. This Disorder seldom happens to Virgins or Widows, but frequently to married Women, as we are assured by Experience; though they are sometimes observed in the two first, and I myself once saw one of them in a chaste Widow [a]. If we regard the Size and Figure of this Substance, we shall find therein a surprising Difference. Some of them are found not at all adhering to the Uterus; others are attached to it by one or two Blood-vessels, or fleshy Fibres; and others again are very strongly and intimately conjoined [b]. They are generally found alone in the Uterus, but sometimes they are excluded together with the Fœtus. If they are excluded without the Fœtus, it is usually about the End of the second or third Month, the same Pains generally preceding which attend a real Delivery; though the Pains are sometimes more violent, and the other Symptoms more severe, the Hæmorrhage is also frequently so large, as to put the Life of the Mother in the utmost Danger. Sometimes a Mola is retained for many Months in the Uterus, and acquires a Bulk sufficient to distend the Abdomen like a mature Infant. A Mola described.

II. It is, for the first four Months, a difficult Matter to distinguish, whether the Womb is impregnated with this false or a true Conception, since both of them are generally attended with the same Symptoms in that Time: but afterwards they afford Signs different enough to distinguish the one from the other. For, 1. when there is a Mola, the Mother does not perceive those Commotions in the Uterus, as she constantly does from the Infant about the fourth or fifth Month after Conception. 2. A Mola distends the Abdomen equally on all Sides; whereas an Infant makes it most prominent towards the Navel, or one Side. 3. A Mola slips from one Part to another, when the Mother puts herself into different Postures, which is a Circumstance not to be observed, when there is a real and living Fœtus. 4. The Breasts of those who have a Mola, are generally but little or nothing distended with Milk; whereas they are gradually and considerably distended therewith, when there is a real Infant. 5. The Mother is afflicted with more grievous Symptoms during her Pregnancy with a Mola, than with a Fœtus: her Face is of a livid Hue, her whole Habit and Appetite are greatly vitiated and impaired, and she is frequently molested with excruciating Pain about the Region of her Loins and *Pubis*; from all which Signs of a Mola.

[a] The like has been also observed by MAURICEAU towards the latter End of his Book, *Obs.* 33. and by KERKRINGIUS *in Spicileg. Anatom.* Obs. 81. which are discharged with violent Pains.

[b] Instances of this Disorder may be seen described by HILDANUS, *Cent.* II. *Obs.* 52. GUILLEMEAU *Lib. de Gravidit.* Cap. IV. SIGISMUNDA *apud* CONNOR *in Diss. Med. Physic. de humani Uteri Sarcomata*, pag. 57. SAVIARD *Obs.* 36.

one

one may conjecture, that there is not a Fœtus, but a Mola in her Uterus. But it is to be obſerved, that ſometimes a Dropſy in theſe Parts may occaſion all the preceding Symptoms of a Mola. 6. A particular Change in the internal *Os Uteri*, which a ſkilful Surgeon will perceive by the Touch, clearly diſtinguiſhes a true Conception from a falſe one. And, laſtly, in a falſe Conception the Patient generally complains of a darting Pain about the Region of the Uterus.

Method of diſcharging a Mola.

III. When you are convinced, that there is not an Infant, but a Mola, in the Womb, the next Buſineſs is then to attempt its Expulſion by proper Medicines: and if they miſcarry, an expert Midwife or Surgeon ſhould endeavour to deliver this foreign Body from the Uterus by a judicious Application of the Hand. If the Mouth of the Uterus ſhould be too ſtrongly contracted to admit the Hand of the Operator for this Purpoſe, it will then be neceſſary to excite the Mother's Throws by the Adminiſtration of briſk Cathartics and ſtrong Clyſters; while the *Os Uteri*, and Parts adjacent, are in the mean Time gradually relaxed and opened by the Application of emollient Fomentations, *&c.* Which done, one or two of the Fingers are to be firſt gently inſinuated, and then the whole Hand by Degrees, in order to extract the Mola, as we have before directed for the Fœtus, *Chap.* CLIV. If the Mola adheres firmly to the Uterus, which it frequently does, it is then to be gently ſeparated by the Fingers before its Extraction, as we are told by HILDANUS [a], who performed this Operation. But if the Fingers are not able to make this Separation, it will then be neceſſary to apply a Pair of long and obtuſe-pointed Cutting-forceps, like that which we have repreſented in *Tab.* XXXIV. *Fig.* 1. and which, we are told, were ſucceſsfully uſed by SIGISMUNDA, a Midwife of *Brandenburg*, in the like Caſe. Laſtly, if the Mola is too large to be in this Manner extirpated entire, it may be carefully ſeparated and extracted in Pieces, either with the Fingers, a falciform Knife, or Hook, repreſented in *Tab.* XXXIII. *Fig.* 11, 12. or the double one, *Fig.* 21. Thoſe who are deſirous of more upon this Head, particularly with regard to the Nature and Extraction of Molæ, may conſult the Obſervations of HILDANUS, ROONHUYS and MAURICEAU. To conclude, when a Mola does not occaſion any bad Symptoms or Uneaſineſs in the Mother, and its Extraction appears difficult, in that Caſe no Violence ought to be uſed, ſince we have many Inſtances of their being retained without any great Detriment to the Patient as long as they live; as we read in HILDANUS, *Epiſt.* XXXVIII. XXXIX.

CHAP. CLVII.

Of a Prolapſus Uteri, *or bearing down of the Womb.*

Kinds and Degrees of this Diſorder.

I. AN entire falling down, or *Prolapſus* of the Womb, is, by many Phyſicians [b], eſteemed and aſſerted to be a thing impoſſible in Nature: where-

[a] *Cent.* II. *Obſ.* 52. and *Epiſt.* 38 and 39.

[b] Of this Opinion are MEEKREN, *Obſ.* Cap. 54. ROONHUYS *Obſ.* Lib. II. Cap. *de Vagina Prolapſ.* VAN HOORN *Microtechn.* Sect. II. Part 1. § 28. BARBET. *in Chirurg.* VANDER BEEKE

as it is apparent, from the Observations of many eminent Physicians, both ancient and modern, that the Uterus does sometimes fall down, and hang [a] out of the Vagina. Among which we may reckon those as the chief, which are inserted in the chirurgical Observations of the celebrated RUYSCH, *Obs.* 1, 7, 9, and 10, which are illustrated with elegant Figures, from whence we have taken the two represented, *Tab.* XXXIV. *Fig.* 2 and 3. After RUYSCH we may reckon the celebrated Surgeon of *Paris*, SAVIARD, who gives us about ten Instances of this Accident [b] coming under his own Observation. To him we may add HOFFMAN, SHACHERUS, SLEVOGTIUS, and VATERUS, who have each of them described, and been Eye-witnesses of the *Prolapsus Uteri*. And lastly, the Physician BURGRAVIUS [c] of *Francfort*, with several others, have lately observed the same Disorder: to which I may add, that I myself have several Times seen a true Prolapsion of the Uterus. When the Uterus only descends into the Vagina, it is then termed a Descent, or bearing down of the Womb; but when it proceeds further, and appears out of the Vagina, it is then properly denominated a *Prolapsus Uteri*. This may be of two Kinds; either without Inversion, when the *Os Tincæ* only appears externally, *Tab.* XXXIV. *lit.* C. *Fig.* 2. or, with Inversion, when the *Fundus* presents itself to View without the *Os Uteri internum*; see *Fig.* 3. both which Cases have been observed by the forementioned Authors [d].

II. The *Prolapsus Uteri without* Inversion is generallly distinguished from that *with*, by its *Os internum*, which does not appear in the last, as it does in the first, as we have represented in *Tab.* XXXIV. *Fig.* 2. *lit.* C, whereby it may be also distinguished from a Prolapsus of the Vagina, or an Excrescence of that Part. It may be worth our Observation, in this Place, to take Notice of a particular Case, elegantly described and represented by WIDEMANNUS, present Director of the *Academia Curios. Germ.* in which the whole internal wrinkled Coat of the Vagina was prolapsed in such a Manner, that every body imagined it a *Procidentia Uteri*, before they were convinced of the contrary by opening the Body, by which they found the Uterus itself in the natural Site. The Figure of this Case we have represented in *Tab.* XXXIV. *Fig.* 4. that our Reader might the better distinguish a Prolapsus of the Vagina from that of the Uterus. So that the Appearance of an *Os Uteri* at *lit.* F. is not an infallible Sign of a Prolapsus thereof, as it hath been generally taught: but the prolapsed Parts ought to be more carefully examined, in order to discover whether it be a Descent of the Vagina, or *Os Uteri*. The forementioned Author Diagnosis.

Lib. *de Procidentia Uteri.* KERKRINGIUS *in Spicileg. Anat.* Obs. 20. VERDUC *in Pathol. Chirurg.* and the many Authors cited by these.

[a] As ÆTIUS, ÆGINETA, ROSSET, AQUAPENDENS, CARPUS, PLATERUS, PAREY, PLEMPIUS, LANGIUS, FERNELIUS, HILDANUS, MARCHETTI, VESLINGIUS, BARTHOLIN, VANDER, WIEL, PECHLIN, SOLINGEN, MAURICEAU, &c.

[b] In *Obs.* 10, 11, 12, 13, 15.

[c] In Ephem. Nat. Cur. Cent. IV. pag. 261.

[d] See Commerc. Litterar. *Norimb. An.* 1733. pag. 362. —— WESSENFIELD de Inversione Uteri sub præsidio BERGENII, *Francofurt.* 1732. Nor ought we to omit the warm Disputes between the two *Hamburg* Physicians, VANDER BEEKE and GARMEER, the first denying, and the last asserting and defending the Reality of this Disorder. But when the Opinion of our University at *Helmstadt* was demanded on the Subject; their Assent was given in Favour of GARMEER, who has also himself defended the Thesis with learned Arguments and solid Experience.

does not indeed give us any diſtinguiſhing Mark, whereby to know ſuch a Prolapſion of the Vagina from that of the Uterus; though he obſerves, that his Probe paſſed further through this apparent *Os* of the Vagina, *lit.* F. than the Cavity of the Womb would admit of, *viz.* near ſix Inches. But whether this Sign always preſents itſelf, can be only confirmed or diſproved by more Obſervations of the like Kind.

A Prolapſus Uteri and Vaginæ difficult to diſtinguiſh.

III. A Prolapſus of the Uterus and Vagina are not only difficult to diſcern, but alſo to diſtinguiſh from each other; as may appear from the groſs Miſtake made, not only by the Surgeons of *Thoulouſe*, but alſo of *Paris*, who publickly declared a Maid of thirty Years old, to be an Hermaphrodite, and to have the male Sex moſt predominant, who had only a *Prolapſus Uteri* from her Youth: and therefore the Senate of *Thoulouſe* commanded, at her Peril, that ſhe ſhould, for the future, wear Men's Cloaths inſtead of Women's. But, ſome Time afterward, this reputed Hermaphrodite, dreſſed like a Man, and armed with a Sword, being more accurately examined by SAVIARD at *Paris*, ſhe appeared to be really a Woman, into which he tranſmuted her by replacing the Uterus; whereupon ſhe was ordered by the King to reaſſume her female Dreſs. The Surgeons of *Thoulouſe* ſeemed to have formed their Judgment with too much Precipitation and want of Attention, ſince in the whole diverting Hiſtory, related at large by SAVIARD in *Obſ.* 15. we do not meet with ſo much as the Appearance of either Penis or Teſticles; without which I can ſee no Reaſon why they ſhould pronounce any Perſon a Man, eſpecially as ſhe had very large Breaſts, and a Woman's Face without a Beard.

Cauſes.

IV. The apparent and moſt general Cauſe of a *Prolapſus Uteri*, is from a too great Relaxation and Weakneſs of its Ligaments, and of the Vagina, upon which Account this Diſorder is moſt frequently obſerved to follow a difficult Labour, or other violent Straining, though it may ſometimes happen even to Maids and young Girls [a]. Let us now conſider the other Species of this Diſorder, in which the prolapſed Uterus is inverted like a Bag; ſo that its internal Surface appears outermoſt, its internal Orifice lying at the ſame Time concealed in the Vagina, as in *Fig.* 3. B. of which, among others, we have a remarkable Inſtance deſcribed and cured by GENSELIUS [b]. As the Uterus prolapſed in this Manner, reſembles a Mola, or fleſhy Excreſcence, we find it has occaſioned ſome imprudent Surgeons and Midwives to miſtake the Caſe, and, by an improper Treatment with violent Pulling, &c. to endanger the Life of the Patient [c]. Nor is this Diſorder hardly ever obſerved, but when the Uterus is forced down together with the Secundines, or after very difficult Labour, whereby the *Os Uteri internum* is ſo much dilated, as eaſily to tranſmit the Body of the Womb through itſelf [d]; eſpecially when the Throws continue violent ſome Time after

[a] Inſtances of which we have in DE GRAAF *de Org. Mulier.* MAURICEAU *Obſ.* 96. SAVIARD *Obſ.* 13. 15. Miſ. Nat. Cur. Dec. I. An. 6. *Obſ.* 73.

[b] In Ephem. Nat. Cur. Cent. II. *Obſ.* 193. with other Writers there cited.

[c] See HILDANUS, BARTHOLIN, Cent. 2. Hiſt. 91. VANDER WIEL Cent. 1. *Obſ.* 67. MARCHETTI *Obſ.* 61. MURALTUS Miſc. N. C. Dec. 2. An. 1. *Obſ.* 112. SAVIARD *Obſ.* 15. Commerc. Litter. Norimb. Ann. 1733. pag. 302.

[d] See RUYSCH in *Obſ.* Citat. & in Adverſ. Anat. *Dec.* II. *Obſ.* 10. MAURICEAU Lib. III. Cap. 6. & in *Obſervat.* 355, 685. STALPART, VANDER WIEL *Obſ.* Rar. Cent. 1. *Obſ.* 67.

the Birth, so that by straining, this Part is forced through the Vagina and *Labia pudendi*. But whatever be the Cause of the Disorder, if the Uterus is not speedily reduced to its natural Situation, the Case soon becomes past Cure, and kills the Patient, as is justly observed by the forementioned Authors; and therefore no Time should be lost before the Patient is relieved.

V. In order to reduce the prolapsed Uterus to its natural Situation, after the Patient has discharged her Urine, the Surgeon or Midwife is to place her in a proper Posture, lying on her Back upon a Bed, with her Hips elevated; and, after a careful Separation of the Placenta, if that adheres to the Uterus, the latter is to be prudently and speedily replaced with the Fingers. Which may be most commodiously performed by returning the pendulous Part, *Fig.* 3. C, with the three middle Fingers, passing them first through the Vagina, and then with the whole Hand into the Cavity of the Abdomen, which may be done the more easily, as the Accident happens sooner after the Delivery, while the *Os Uteri* and Vagina are relaxed and dilated. When the Parts have recovered their former Situation, the Patient should be put to Bed, and ordered to lie still on her Back, with her Thighs close to each other: for Rest in this Posture is very often of itself sufficient. Yet it may not be amiss to secure the Womb from falling down again, either in coughing, sneezing, or otherwise, by retaining the Lips of the *Pudenda* together by Compresses and a proper Bandage. If this Disorder has continued any considerable Time, it will not be long before it proves fatal to the Mother, according to the Observation of Hildanus, Stalpart, Ruysch, Saviard, and others: for the Stricture made upon the *Os Uteri*, by the Inversion of its upper Part, becomes at length so much increased by the Inflammation, as to prevent its being replaced, and turning to a Mortification, destroys the Patient. If the Surgeon is called in time to a Woman in this Disorder, his first Business is to remove the Inflammation, and to endeavour to return the Uterus. Before which should be premised a Discharge of the Urine, and bleeding in Proportion to the Circumstances of the Case; so that by preventing any Resistance to the Womb from the Bladder, and by relaxing the Parts with Fomentations of warm Milk and Water, with other emollient and lubricating Medicines, the Hand of the Operator may, by these Means, replace the Parts without much Difficulty[a]. Otherwise, it will be impossible for the Patient to survive, even though the Uterus were to be secured with a Ligature, and extirpated. For Ruysch gives us an Example of this Disorder, in which the Surgeon attempted to relieve the Patient, by making a Ligature, and cutting off the prolapsed Body of the Womb: but his Design miscarried, and the Patient died soon after.

Treatment.

VI. This Disorder is not near so dangerous when the Womb appears externally from a Relaxation of its Ligaments, but without Inversion, and not in the Time of Labour; to distinguish which, we have given Directions before, N°. II. For, in this Case, the Cause being from Relaxation, not Violence, it is not so likely to be attended with Inflammation, or Mortification. It is to be observ-

Treatment of a slight Prolapsus without Inversion.

[a] It has been a Matter of Consideration with myself, whether Scarification of the tumified and inflamed Uterus might not be used to Advantage in many of these desperate Cases; at least I think there is Reason enough to make a Trial.

ed, that this Diſorder frequently happens, not only to Women in hard Labour, but alſo ſometimes to Maids, though ever ſo chaſte; as may be ſeen in the Obſervations of Mauriceau, Saviard, and others. The Conſequences of this Diſorder, when neglected, are frequently very grievous; ſuch as violent Suppreſſion of the Urine, excruciating Pains in the Loins, with an Inflammation, Exulceration, Mortification, a Scirrhus or Cancer, which become the more obſtinate and malignant as the Caſe is longer delayed. When this Diſorder proceeds from a Relaxation of the Parts in a weak Habit, and has been ſome Time neglected, it is often impracticable to ſuſtain the Womb in its proper Situation: but it will relapſe again either in walking, ſneezing, coughing, or moving the Body; eſpecially if it be not aſſiſted by a proper Bandage, and a retaining Inſtrument internally [a]. But if the prolapſed Uterus is once affected with a Cancer or incipient Mortification, the Reduction of it will then be to no Purpoſe, as Ruysch takes Notice in *Obſ.* 9.

Method of Cure.

VII. If the Surgeon perceives, that the prolapſed Uterus is not yet infeſted either with a Cancer or Mortification, his Intentions of Cure are chiefly two: 1. To reſtore the Parts to their natural Situation; and then, 2. to prevent a future Relapſe of them. With regard to the firſt, that may be generally performed without much Difficulty, either with the Fingers, as we before directed, N°. V. or by a large Wax-candle: though many Women thus diſordered find no Difficulty in reducing their prolapſed Uterus themſelves without other Aſſiſtance. But, in difficult Caſes, it is often found neceſſary, not only to relax and lubricate the Parts, but alſo to empty the Bladder and Inteſtines, in order for a Reduction by the Hand. But to prevent a Relapſe is often difficult without the Aſſiſtance of Bandage, and a proper Machine. When the Parts therefore of the Uterus and Vagina appear to be greatly relaxed, and their Ligaments weakened, it may be proper, during the Time of the Patient's lying ſtill in Bed, to inject aromatic and reſtringent Fumes and Fomentations by the Inſtrument, *Tab.* XXXIV. *Fig.* 14. after which may be applied the T. Bandage, with a large Compreſs to the *Labia pudendi*. When the Uterus is ſwelled and inflamed, ſo as to prevent its Reduction, it ſhould be firſt treated with diſcutient Fomentations, and the Perſon diſpoſed to reſt for ſome Time in a warm Bed, before the Operation be attempted. When the Womb appears to be ulcerated, even that ſhould not delay its Reduction: for an Ulceration of this Part may be better cured in its natural Situation than in a prolapſed Poſture, as Saviard directs in his *Obſ.* He likewiſe met with a Prolapſion of the Uterus in a Maid, who had alſo the Stone in her Bladder; and, after replacing the Uterus he then extracted the Stone, and removed both Diſorders. See *Obſervation* 15. But ſhe was obliged to wear a Peſſary.

Inſtruments to ſuſtain the Parts.

VIII. If the Diſorder is become inveterate, and the Parts will not of themſelves continue in their natural Poſition, it will then be neceſſary to paſs an Inſtrument or Peſſary up the Vagina for that Purpoſe. The moſt convenient Peſſaries for this Uſe, are thoſe made of Box, hard Aſh, or Cork, perforated in the Middle, and covered over with Wax, repreſented in *Tab.* XXXIV. *Fig.* 6, 7, 8, 9. They may be made of Ivory, Silver, or Gold, for the more

[a] See the Obſervations of Ruysch and Saviard on this Head.

opulent.

opulent. One of theſe Peſſaries of a proportionable Size is to be paſſed by the Fingers up the Vagina to the *Os Uteri*, to prevent its ſubſiding; and that the Inſtrument may be drawn out, and cleanſed occaſionally by the Patient, a String may be faſtened to it, as repreſented in *Tab.* XXXIV. *Fig.* 6, 10. The Peſſary may be deemed of a proper Size, when it is not too eaſily paſſed up the Vagina, but, fixing itſelf in the Vagina againſt the Uterus, ſuſtains the latter, and ought frequently to be twice the Diameter of the former. It is neceſſary that the Inſtrument be perforated in the Middle, for the Extramiſſion of the Menſes, and other Sordes of the Part: and therefore thoſe Peſſaries, which are of a pyriform, or oval Figure, as in *Fig.* 10. are not ſo convenient and uſeful, though they are propoſed and deſcribed for this Purpoſe of an enormous Size by Parey, Hildanus, Sculetetus, Roonhuys, and others[a]. To which we may add, that thoſe perforated Peſſaries will both admit ſtrengthning and aſtringent Fumigations and Injections to the affected Parts, and at the ſame Time alſo allow a Paſſage to the Semen of the Huſband; which Advantages, the other Peſſaries that are not perforated, are deprived of. It is to be obſerved, that ſome Women are troubled with this Diſorder, when they are not with Child; and when they are, it diſappears: for the Dilatation of the Womb in Geſtation prevents its Deſcent. See Pechlin. *Obſ.* 20. and Saviard *Obſ.* 12. But this is not always the Caſe; for ſometimes the *Os Uteri* has appeared externally with the Head of the Fœtus capable of being felt by the Finger. Conſult Mauriceau *Obſ.* 6, 67, 95. Saviard *Obſ.* 15. and Wideman *Ephem. N. Cur. Cent.* 8. *Obſ.* 98.

IX. Saviard, in ſeveral of his Obſervations[b], mentions an elaſtic Peſſary made of Steel, which ſurpaſſes all others in this Diſorder; but takes no notice either of its Size or Structure. However, Goelichius of *Francfort* formerly publiſhed a Diſſertation 1710, in which he deſcribes a new Method of curing the true *Prolapſus Uteri* by an elaſtic Peſſary made of Steel-wire, of which he gives us the Figure, but not in its proper Length or Thickneſs; which I have therefore taken Care to amend in my Figure of it, *Tab.* XXXIV. *Fig.* 11. He orders its internal Surface to be covered with Linen, and its external with ſoft thin Leather, that it may not give any Pain or Uneaſineſs to the Patient: and to the Baſis of the Cone he directs a String to be faſtened on each Side, to extract it at pleaſure. The Inſtrument is to be a little compreſſed when it is introduced into the Part; after which it will expand itſelf by its Elaſticity, ſo as to remain fixed, and prevent a Deſcent of the ſuperincumbent Uterus. Its Author indeed confeſſes, that he has not yet made Trial thereof: but as it is furniſhed with all the Requiſites of a good Peſſary for this Purpoſe, he thinks it cannot fail of Succeſs. But as this Inſtrument is very ſubject to be eat up with Ruſt, to which Iron or Steel-wire is ſo extremely liable, upon contract with any Humidity, it has been my general Practice to uſe only the wooden Peſſaries covered with Wax, as repreſented in *Fig.* 6, 7, 8; by which means I have generally obtained the Effect deſired.

Elaſtic Steel Peſſaries.

[a] Confer Mauriceau Obſ. 182. Saviard Obſ. 13. Deventer Cap. 29. &c.
[b] See his Obſervat. XIII. and XV.

CHAP.

CHAP. CLVIII.

Concerning the Prolapſus, *or bearing down of the Vagina.*

Nature and kinds of the Diſorder.

I. IT is not unfrequent for Surgeons and expert Phyſicians, as well as ignorant Midwives, to confound or miſtake a Prolapſus of the Vagina and Uterus with each other, and to call them by one Name, of which we have many Inſtances[a]. But they are eaſily diſtinguiſhable to one, who, attending to the Symptoms of each Diſorder, is alſo acquainted with the anatomical Structure of the Parts. We take a Prolapſus of the Vagina to be, when that Body appears either wholly or in Part without the *Labia pudendi*, whether it be from Relaxation, or any other Cauſe, in the Manner repreſented at *Fig.* 4. *Tab.* XXXIV. A total Prolapſion of the Vagina ſhews itſelf without the relaxed *Labia* like a fleſhy Ring, red or bloody, and ſwelled more or leſs according to particular Circumſtances. If the prolapſed Part ſhould be violently inflamed and ſwelled, proceeding from difficult Labour, there is then great Danger of an incipient Mortification[b] following, as I have frequently obſerved: but when there are none of thoſe Symptoms, the Caſe is without Danger, and may be ſuſtained without any great Uneaſineſs by the Patient. In a partial Prolapſus of the Vagina, when only a ſmall Portion of it appears, it may be frequently miſtaken for an Excreſcence, Ficus, or Sarcoma; and conſequently the Surgeon may treat it, to the great Danger of the Patient, either by Ligatures, or the Knife, as we have obſerved in Chap. CL[c]. In order to diſtinguiſh a Prolapſus Uteri from that of the Vagina, and both from an Excreſcence; it is to be obſerved, that the firſt never happens with an Inverſion but immediately after Labour; whereas the Vagina may ſubſide and appear externally at any Time, either within or without the Time of Geſtation. But, as I have before obſerved, the Accident more frequently attends a difficult Labour; as it happened to a Patient of mine ſo ſuddenly, while the Fœtus was *in Utero*, that the prolapſed Vagina was, in the ſpace of twenty-four Hours, ſwelled to the ſize of one's two Fiſts, appearing without the *Labia*, and beginning to be mortified, of which the Woman died in eight Days Time, notwithſtanding ſhe was delivered. From what has been ſaid I think it apparent, that thoſe Phyſicians ſpeak inconſiderately, who aſſert, that the prolapſed Uterus may be extirpated, not only without hazarding the Patient's Life[d], but alſo that they may conceive and bear Children, notwithſtanding they are deprived of this Organ. Indeed no body denies that a Woman may conceive and bear Children after a Removal of an Excreſcence from the Uterus,

[a] HILDANUS (Cent. IV. Obſ. 60, 61, and 62.) gives us three Hiſtories of this Diſorder; but it does not appear from either of them, whether the Prolapſion was of the Uterus or Vagina.

[b] As we have Inſtances in SOLINGEN *Obſ.* 26. & NOLET Obſ. Curieuſ. *Obſ.* 5.

[c] Inſtances of this Diſorder are given us by TULPIUS, *Lib.* III. *Cap.* 33, 34. ROONHUY's *Obſ. Chirurg.* Part II. pag. 68. KERKRING. *Obſ.* 53. BONET *Med. Septent.* Vol. II. *Obſ.* 33. But the moſt curious and remarkable Inſtance of this Caſe is given us by MEEKREN in the 54th Chapter of his Obſervations.

[d] A Caſe of this Nature we have in CARPUS, and in *Lib.* XXIII. *Cap.* 41. of AMBR. PAREY.

or

or a part of the Vagina hanging out, in Form of the Womb, as in *Tab.* XXXIV. *Fig.* 4 and 5. But, for the ſame thing to ſucceed when the Uterus itſelf has been extirpated, is altogether fabulous and impoſſible [a].

II. With regard to the Treatment of this Diſorder, when it is without Inflammation, the prolapſed Parts ſhould be returned without the leaſt Delay, to prevent an Inflammation, Scirrhus, or Gangrene. If the Parts are therefore without Inflammation, they may be fomented with ſome aſtringent and diſcutient Liquor before they are replaced; or they may be returned immediately without ſuch Treatment either by the Fingers or a large Wax Candle, after which the Patient ſhould keep her Bed for ſeveral Days, retaining her Thighs cloſe together without moving her Body. However, I muſt needs think it the beſt Method to foment the Parts before their Reduction with a Decoction of diſcutient aromatic and aſtringent Herbs in red Wine, or *in Aqu. Calc. cum Sp. V.* For the ſame Purpoſe may be alſo uſed the Fumes of Maſtic, Frankincenſe, Myrrh, Amber, *&c.* conveyed to the Parts by a Funnel; ſee *Tab.* XXXIV. *Fig.* 4. concluding with the T Bandage. By which means the prolapſed Parts frequently recover their priſtine Strength and Tenſion. In ſome Caſes it will be very ſerviceable to treat the Patient with mineral Waters of the chalybeat kind, and Preparations of Steel. But if the Diſorder is ſo inveterate as not to yield to any of the means propoſed, the Surgeon is then to uſe his Endeavours for palliating the Diſorder, and mitigating its Symptoms, by ordering the Patient conſtantly to wear the T Bandage.

Treatment when without Inflammation.

III. If the prolapſed Parts are inflamed, they ſhould be not only treated with diſcutient Fomentations and Cataplaſms applied externally, but alſo Internals and Bleeding ſhould not be neglected; that, after reducing the Inflammation, the prolapſed Parts may be returned, which they cannot with Safety before, without Danger of a Mortification following. But if the Inflammation is not conſiderable, the Parts may then be frequently returned without any Danger: though if any Sphacelus or Excreſcence appear, which may be known from its Blackneſs and fetid Smell, diſcutient Fomentations and Cataplaſms ſhould be then applied, and the Parts treated as we have before directed for a Sphacelus, Part I. Book III. Chap. XIV.

Treatment when joined with Inflammation or Sphacelus.

CHAP. CLIX.

Of an Incontinency of the Urine in Women.

I. AN Incontinency of Urine in Women frequently proceeds from ſome Violence in difficult Labour, or from a too great Dilatation of the Sphincter and Neck of the Bladder, made by extracting a large Stone. But ſometimes it happens without any external Violence from a natural Weakneſs, or a Palſy of the Sphincter-muſcle; which is alſo ſometimes obſerved in Males, as we have

Nature of the Diſorder.

[a] Notwithſtanding we have ſeveral Authorities collected by MEEKREN in *Obſ.* 54.

before

before taken notice in Chap. CXXXVI. But whatever be the Cauſe of the Diſorder, when it is of long ſtanding, (or if it proceeds from a Palſy) it is too often found inflexible, both to all the internal Medicines and external Means that have been hitherto contrived.

Treatment thereof.

II. When this Diſorder follows from an Extraction of the Stone, the Patient being young, it frequently diſappears of itſelf, or at leaſt by uſing the external or internal Remedies mentioned in N°. II. of the preceeding Chapter. But if the Diſorder be of long ſtanding, and does not yield to thoſe Means, it is by Phyſicians generally eſteemed incurable. However, HILSCHERUS, in a Diſſertation upon the Subject, affirms, the moſt likely Method of curing this Diſorder to be with a Peſſary, or Ring of a proper Size, as for the *Prolapſus Uteri*, *Tab.* XXXIV. *Fig.* 6, 7, 8. for by introducing a Peſſary, or Ring of this Kind, into the Vagina under the Urethra, the latter is ſo firmly compreſſed thereby, as to render the Urine capable of being retained or diſcharged at Pleaſure. See *Tab.* XXIX. *Fig.* 2, B. C.

CHAP. CLX.

Of the Perinæum *lacerated in Women.*

EVERY one that knows any thing of Midwifery and Surgery cannot be ignorant, that the Perinæum, or that Part between the Vagina and Anus, is frequently lacerated in Women when they have a difficult Delivery, either from the Fœtus being very large, monſtrous, or extracted double with its Nates foremoſt. To prevent a Diſorder of this kind from incurring worſe Conſequences by Neglect, in the firſt Place, the Wound is to be waſhed and cleanſed with warm Wine or Brine: after which it may be dreſſed with ſome vulnerary Balſam, or rather ſprinkled with a Powder of Gum Maſtic and Sarcocol. And if the Wound be not large, its Lips may be conjoined with ſticking Plaſters: but if it be large, it may be better to join them by the knotted Suture with a crooked Needle and Wax-thread, as in other deep Wounds. But particular Care ſhould be taken, that the Patient lie ſtill in Bed, with her Thighs cloſe to each other, and to cleanſe and dreſs the Wound twice or thrice a Day till it is healed: which is often impracticable, when the Diſorder has been neglected at the Beginning, as SOLINGEN remarks, *Obſ.* 82.

CHAP.

CHAP. CLXI.

Of Diſorders and Operations proper to the Anus, *and of* Clyſters.

I. A Clyſter is a liquid Remedy, to be injected chiefly at the Anus into the large Inteſtines; with whoſe Adminiſtration almoſt every Nurſe is acquainted. The Word is derived from the *Greek* κλύζω, *abluo*, and is ſynonymous with Ἔνημα, *Injectio*. Theſe kinds of Remedies were by the *Latins* called *Lotiones*, as we read in CELSUS; from whence the *French* Term *Lavement* ſeems to be derived. In *Germany*, *Holland*, and moſt other Parts, this Remedy is uſually adminiſtred by the Bladder of a Hog, Sheep, or Ox, perforated at each End, as in *Tab.* XXXIV. *Fig.* 12. AA. being large enough to hold about a Pint. One of the Apertures in the Bladder is to be faſtened with ſmall Packthread, CC. tied round the End of a Pipe made of Ivory or Bone, marked B B. By the other Aperture the Clyſter is to be poured into the Bladder; after which this Aperture marked D, is tied with a Ligature, to prevent its Eſcape. Which done, the Pipe, lubricated with Oil or Butter, is thruſt into the Patient's Anus, lying on either Side with their Hips elevated; then untying the Ligature near the Pipe C, the Bladder is preſſed by the Hands, and the Liquor by that means forced into the Inteſtines. The Operation being finiſhed, the Inſtrument is extracted, and the Patient ordered to lie ſtill in his Bed, till he has a ſtrong Motion to ſtool: for, ſays CELSUS, *Non primæ Cupiditati dejectionis æger protinus cedere debet; ſed ubi neceſſe eſt, tum demum deſidere.* Injection by a Pipe and Bladder.

II. The *French*, and ſometimes the *Dutch*, and other Nations, uſe a Pewter Syringe inſtead of the preceding Apparatus, the Capacity of the Inſtrument being large enough to hold a Pint. The Pipe of the Syringe nearly reſembles the former; but the Liquor may be thereby not only drawn in with more Eaſe and Expedition, but alſo more forcibly expelled and drove further into the large Inteſtines. Yet the preceding Apparatus is more concealable and portable, and alſo leſs uneaſy to Infants and Women with Child. But for over-modeſt or baſhful Patients, the *Paraſians* faſten a Leather-pipe of about half an Ell long to the Syringe, whereby the Patient can adminiſter the Clyſter to himſelf; or, after inſerting the Pipe into his own Anus, another Perſon may force the Liquor out of the Syringe through the Pipe which lies under the Bed-cloaths. Upon this Head the Reader may conſult HILDANUS *Cent.* I. *Obſ.* 7, 8. BARTHOLIN. *Hiſt. Anat. hb. Cent.* 6. DE GRAFF, in a profeſſed Diſſertation upon the Subject, with JUNKENIUS in his Surgery, and VALENTINUS in his *Politica Exotica*, pag. 89. where the Machinery for this Purpoſe, and the Method of uſing the ſame, is deſcribed at large. For the reſt, I ſhall only obſerve it as a neceſſary Caution, never to adminiſter this Remedy either too hot or cold [a], but tepid: for either of the former will be injurious to the Bowels. Injection of them by a Syringe.

[a] BARTHOLIN (in Hiſt. Anat. *Cent.* I. *Obſ.* 76.) has remarked the Death of a Patient to follow from the Adminiſtration of a Clyſter cold.

Their Compoſition. III. The Ingredients for this form of Medicine, with their Proportions and Uſes, belong properly to the Phyſician. However, the Surgeon may learn from Celsus, that in ſlight Caſes ſimple Water may ſuffice; or elſe Mead, Ptiſan, or a Decoction of Fenugreck, Mallows, and other emollient Herbs, may be uſed. To conſtipate the Bowels, a Decoction of Vervine[a]: Sharp and gently ſtimulating Clyſters may be made of Sea or Salt-water, with the Addition of Oil, Nitre, or Honey. When the Clyſters is more acrimonious, it evacuates more; but it is not ſo long retained by the Patient. An emollient Clyſter for a nephritical Caſe, or a Dyſentery, may be made of warm Milk only, or a Decoction of Camomile, Paul's Betony, Honey, and Theriaca: and ſometimes ſimple Oil may be injected for a Clyſter, as Galen did in a Cholic.

Their Uſes. IV. With regard to the Uſe of Clyſters, they may be applied to Advantage; 1. In Coſtiveneſs, to excite a Stool: 2. To mitigate Pain in Cholics, Dyſenteries, the blind Piles, Stone, or Gravel, *&c.* 3. To cauſe a Revulſion downward in lethargic Diſorders, Apoplexies, Frenzies, and other Diſorders of the Head: 4. To promote Labour, whether the Fœtus be dead or living: and, to expel the Secundines where they are preternaturally retained.

Nouriſhing Clyſters. V. Laſtly, Clyſters are ſometimes uſed to nouriſh or ſupport a Patient, who can ſwallow little or no Aliment, by reaſon of ſome Impediment in the Organs of Deglutition: for which Purpoſe may be uſed Broth, Milk, Ale, and Decoctions of Barley or Oats with Wine. Clyſters were uſed for this Purpoſe by the Ancients long before the Moderns, as appears from Celsus, who recommends Ptiſan or Gruel; though there are many Phyſicians, who deny that they can be of any ſuch Uſe as to nouriſh the Patient. Notwithſtanding which we have a remarkable Inſtance, among others, of a Woman, that could not ſwallow, for the Space of 14 Days, during which Time ſhe was ſupported by nouriſhing Clyſters, as we are told by Garengeot in his *Chirurgical Operations*. To which we may add, that there really are lymphatic or lacteal Veſſels in the large Inteſtines, capable of abſorbing and conveying nutritious Juices to the Blood; as may appear, not only from Anatomy, but alſo from many Clyſters being totally retained without any Diſcharge of their liquid Parts, as I have ſometimes obſerved.

Smoky Clyſters. VI. The Moderns have a new kind of Clyſter, made of the Smoke of Tobacco, which appears to be of conſiderable Efficacy, and was introduced firſt by the *Engliſh*, after whom it has been uſed by ſeveral of the other *European* Nations. It is uſed chiefly when other Clyſters prove ineffectual, and particularly in the Iliac Paſſion, and in the *Hernia incarcerata*: though it may be uſed for other Purpoſes, and is peculiarly ſerviceable in an obſtinate Conſtipation or Obſtruction of the Bowels. Various Inſtruments have been contrived and uſed for this Purpoſe: the firſt of which I believe was that of Bartholin[b], which is followed by another of Stisser[c], formerly Profeſſor at *Helmſtadt*; and others have been alſo deſcribed by Dekker and Valentine. See *Tab.* XXXIV. *Fig.* 13. But though the Machinery of theſe Authors differ in ſome reſpects, yet they all agree in this, that they have an Iron or Braſs Capſula

[a] Though Celsus often mentions *verbena*, I imagine he intends corroborating Plants in general thereby, rather than the common Vervine.

[b] In Hiſt. Anat. Cent. VI. Obſ. 66. [c] In Epiſt. de Machinis Fumiductoriis, *Hamb.* 1686. edita.

marked

marked A, large enough to hold about half an Ounce of Tobacco, to which Capsula are fastened two Pipes. One of them marked B, is made of Bone, to be inserted into the Anus; and the opposite Pipe marked C, is made like that End of a Trumpet, which is applied to the Mouth, and being made of Ivory, the Patient, or an Assistant, may blow through it, and force the Smoke of the burning Tocacco E in the Capsula A through the Pipe B into the Anus. In this Manner the Smoke is to be blown up the Anus, till the Patient receives Stimulus enough to excite him to Stool: and if one Pipeful of Tobacco does not produce the desired Effect, the same may be repeated at Discretion. Or, if the common Tobacco is too weak, Recourse may be had to the strongest kind, termed *Canaster:* the Usefulness of which kind of Tobacco has been experienced to good Purpose by myself and others in obstinate or incarcerated Ruptures, when the common Tobacco has proved ineffectual; and when at the same Time the Patient's Case has been judged desperate, it has succeeded so well that I have had no Occasion to use the Knife. The Smoke of the Tobacco seems to produce this Effect, by stimulating the Intestine sufficient to make it contract, and withdraw itself into the Abdomen. For more upon this Subject, the Reader may consult Graffius and Lanzonus, in a professed Dissertation published upon the Subject at *Ferale*, *An.* 1691.

CHAP. CLXII.

Of Suppositories.

A Suppository is a kind of Cone made usually of Soap, Sugar, Allom, or a Piece of Tallow-candle about the Length and Thickness of a Finger, more or less in Proportion to the Size and Age of the Patient, into whose Anus it is to be introduced, in order to give a stool. This Form of Medicine is sometimes compounded of Ingredients adapted to the Patient's particular Case, as of Honey, Salt, Aloes, Colocynth, *&c.* If one Suppository is discharged without giving the Patient a Stool, it may be then proper to introduce a stronger, and after that a third or a fourth, till they produce the Effect required. They are by some lubricated with Oil or Butter, before they are introduced, that they may pass up the more easily: Others use a Lozenge of Sugar, or a Piece of Linen rolled up and dipt in Salt-butter, which, in some Cases, will make the Patient lax enough. For Ulcers of the Rectum, the best Suppositories are made of *Mel. Rosar. cum pulv. Mastic. Myrrh. vel Colophon.* But those compounded with *Euphrobium*, *Aloes*, and Substances which give a strong Stimulus, are advantageously used to promote a difficult Birth, or to expel the Secundines when they are preternaturally retained in the Uterus. For the Administration of this Remedy the Patient should be disposed in the same Posture as in giving a Clyster, as we directed in the preceding Chapter, after which the Suppository is to be gently protruded up the Anus with the Finger.

CHAP. CLXIII.

The Method of opening an imperforated Anus.

Nature and Kinds of the Diſorder.

I. WE frequently meet with new born Infants having no Perforation in the Anus, which are by the Phyſicians termed *Atreti*: which Diſorder may be ſoon diſcovered by the Infant's diſcharging no Fæces for ſeveral Days after Birth, if it be not before obſerved by the Midwife in waſhing and cleanſing the Infant [a]. When the Caſe has been too long neglected, the Aſſiſtance of the Surgeon is frequently called in to no Purpoſe, as ROONHUYS obſerves. The Diſorder itſelf varies according to the Number and Thickneſs of Integuments which cloſe up the Paſſage: but there generally remains ſome Mark or Sign, either of a Prominence or Cavity, which denotes the Part that ought naturally to be perforated. Sometimes a thin Membrane only obſtructs the Paſſage; while, at other Times, the Parts are cloſed up with thick Fleſh: both which are obſerved by SAVIARD, *Obſ.* 3. But whatever be the Circumſtances of the Diſorder, if a Paſſage be not ſpeedily made to diſcharge the Meconium, the Retention of that Excrement will excite Gripes, Vomiting, Jaundice, Convulſions, the Iliac Paſſion, and at length the Death of the Infant. When there is a Cicatrix, or ſome Mark indicating where the Perforation is to be made, the Operation is then not very difficult nor dangerous, eſpecially if the Membrane be thin. But when ſuch Marks are abſent, and the Parts are cloſed by a thick fleſhy Subſtance, the Operation is then in a great Meaſure dangerous, eſpecially when the whole Rectum is in that Manner cloſed, even to the upper Part of the *Os ſacrum*, as I have twice ſeen: for then the Operation is generally performed to no Purpoſe. ROONHUYS (*Obſ.* 2. *Part.* 2.) gives an Inſtance of the *Inteſtinum rectum* terminating in the Bladder. And ſometimes in Girls it terminates in the Vagina; which is a deplorable Caſe.

Apertion when the Fleſh or Membrane is thin.

II. When the Caſe appears remediable, and the Surgeon is determined to perform the Operation, the Infant is to be firſt held in a convenient Poſture by an Aſſiſtant: after which the Membranes may be cautiouſly divided with an Abſceſs Lancet [b], by directing its Point into the Rectum; which may be known to have ſucceeded by the Efflux of the Meconium. This done, the Finger being dipped in Oil is to be paſſed into the recent Aperture, in order to examine the State of the Parts, and Vicinity of the Rectum; that then the Wound may be ſufficiently enlarged either way, according to the Direction of the Inteſtine: after which the Operator ſhould deſiſt till the Infant has freed itſelf from the offending Excrement. Laſtly, a large Tent, ſpread with ſome vulnerary Ointment or Balſam, is to be introduced into the Womb, with a Thread annexed to it, whereby it may be extracted if it ſhould ſlip into the Rectum. A new Tent ſhould be applied after every ſtool; and after a few Days Continuance, the Tent may be ſpread with ſome deſiccative, inſtead of a digeſtive

[a] Inſtances hereof may be ſeen in WIERUS, HILDANUS Cent. I. Obſ. 73. ROONHUYS Obſ. 5. Part I and II. circa finem Obſ. 1, 2, and 3. MAURICEAU in Obſ. & SAVIARD Obſ. 3, *&c.*

[b] See SCULTETI *Armament. Chirurg.* Tab. 45. Fig. 8.

Ointment,

Ointment, as that *de Ceruſſa:* by which means the Part may be cicatrized and prevented from growing together for the future. HILDANUS[a] introduces a leaden Pipe ſpread with *Ung. de Ceruſſ.* inſtead of a Tent, towards the latter End of the Cure; but to prevent the Pipe, or even the Tent, from ſlipping out, it is neceſſary to apply a Compreſs with the T Bandage. But if in two or three Days the Aperture, upon Examination, be thought too ſmall, the Surgeon even then ſhould enlarge it at his Diſcretion.

III. In this Operation it will not be very neceſſary to make an Apparatus of Inſtruments, Bandage, and Dreſſing, becauſe in many Caſes not the leaſt Time ſhould be loſt, in order to preſerve the Life of the Infant: yet it may be convenient to provide a Receptacle for the Fæces, during the Diſcharge of which the Surgeon may prepare his Bandage and Dreſſing. A previous Apparatus unneceſſary.

IV. When the Obſtruction is made by a thick fleſhy Subſtance, the Caſe is then more difficult and dangerous: however, it is better to try to ſave the Infant by performing the Operation, though it ſhould prove ineffectual, than to let it periſh without Help. In this Caſe the Operator is firſt to ſearch with his Finger upon the Part to feel if he can diſcover the Paſſage to the Rectum, marking the Place with Ink, and making his Inciſion about half an Inch wide. If the Fæces do not follow, the Paſſage to the Rectum ſhould be then ſearched for with the Finger, and the Wound enlarged accordingly but with Diſcretion, taking Care that the Edge of the Knife be directed towards the *Os ſacrum*, to avoid wounding the Bladder in Boys, and the Vagina in Girls, concluding the reſt of the Operation as before at N°. II. Diviſion of the thick Fleſh.

V. If the Surgeon can find no Appearance of the Rectum, it is then either abſent or grown together, ſo that the Cure is either impracticable, or at leaſt very uncertain. Yet the Infant ought not to be neglected, and therefore a Perforation ſhould be made either with the Trocar, *Tab.* XXIV. *Fig.* 2. or with a narrow Scalpel, with which laſt the Opening ſhould be enlarged diſcretionally, till the Fæces meet with a Paſſage. But if the Hæmorrhage ſhould be very profuſe, a Tent may be introduced with ſome Styptick, and the Remainder of the Dreſſing managed as before. About twelve Hours after, or twenty-four at the fartheſt, it will be proper to remove that Tent (unleſs it drop of itſelf) and replace it with another, ſpread at firſt with a digeſtive Ointment, and in a few Days with a deſiccative. Or a leaden Pipe may be ſubſtituted in its room, till the Wound is quite healed. If, after all, the Inteſtine cannot be opened, there is no Poſſibility of ſaving the Infant; but he will be ſeized with violent Vomitings of the Fæces, and die in ſtrong Convulſions. When there is no Mark of the Inteſtine.

VI. ROONHUYS, in his *Appendix of Obſervations*, pag. 2. Obſ. 1. gives us an Inſtance of a Girl four Months old, who had indeed a Perforation in the Anus, but ſo ſmall, that her Mother was obliged always to preſs out the Fæces with her Hands. But at length the Parts were ſo cloſed by the repeated Preſſure as to admit no Diſcharge at all; upon which followed a Tumor of the Abdomen, with violent Pains, and a Fever, which threatened the Life of the Infant. He therefore firſt made an Opening with an Abſceſs Lancet, and then enlarged it with Sciſſars; by which means a large Quantity of Fæces were diſcharged, the Tumor of the Abdomen ſubſided, the other Symptoms diſappeared, Some Obſervations.

[a] In *Cent.* I. Obſ. 73.

and

and the Wound was healed, as we directed at N°. II. SCULTETUS alſo gives us a Caſe of the ſame Nature in *Armament. Chirurg.* Obſ. 71. In ſome Girls who have their Anus imperforated, the Fæces have a Paſſage through the Vagina; in which Caſe the Parents would rather let the Patient be thus miſerably afflicted all her Life, than ſuffer the Surgeon to perform his Operation.

CHAP. CLXIV.

Of a Prolapſus Ani.

Nature of the Diſorder.

I. THE *Inteſtinum rectum* is frequently inverted or prolapſed to ſuch a Degree, both in Adults as well as Infants, that it appears near a Hand's-breadth hanging out of its natural Situation. We have a remarkable Inſtance of this Diſorder given us by MURALTUS, in a Woman whoſe *Rectum* was prolapſed in a difficult Labour near the Length of one's Arm: and SAVIARD mentions a Prolapſus of this Part in an Infant to the Length of a Foot. The Diſorder is not only troubleſome, but alſo extremely painful and uneaſy, to ſuch as lead a laborious or itinerant Life; and ſometimes an Inflammation, Tumor, Gangrene, or Cancer ſeizes the Part: an Inſtance of which we have at the latter End of MEEKREN's *Obſ. Chirurg.*

Cauſe and Prognoſis.

II. The Cauſe of this Diſorder may be great Weakneſs or Relaxation in the Rectum, which frequently happens to croſs and clamorous Children, or from a Teneſmus, violent Pains with the Piles, a Dyſentery, a Stone, or Ulcer in the Bladder, a difficult Expulſion of the Birth, or of the Fæces, *&c.* The Diſorder is not difficult to cure when recent, and when the Patient is not of a weak and ill Habit: but, in the contrary Circumſtances, to effect a perfect Cure is next to impoſſible. If a hard Swelling, a Gangrene or Cancer ſhould infeſt the Rectum, the ſame Treatment is to be uſed as propoſed for Tubercles and a Prolapſus of the Vagina, *viz.* the Application of diſcutient and emollient Remedies; and, if they prove unſucceſsful, an Extirpation of the morbid Part.

Reduction.

III. When a Surgeon is called to a Patient in this Diſorder, his Buſineſs is firſt to reſtore the Part immediately to its natural Situation, before he enquires after its Cauſes, or prepares his Bandage and Dreſſing: for the longer the Inteſtine continues prolapſed, the Tumor and Inflammation is generally ſo much the more increaſed, and conſequently the Cure proportionably more difficult. In order to reduce the Inteſtine, the Patient is to be firſt advantageouſly diſpoſed in a prone Poſture on a Bed; and the Rectum being fomented with warm Wine, or its Spirit with Milk, or even warm Water applied with a Spunge or Linen Cloths, it is to be then returned into its natural Poſition with the two Fore-fingers covered with fine Linen, in the ſame Manner as we have directed for returning the prolapſed Inteſtines in Wounds of the Abdomen. This Buſineſs may be generally performed without much Difficulty, when there is no concominant Tumor or Inflammation. But if they are preſent, in order to remove them, the Patient ſhould be bled, and the Parts fomented till the Tumor ſubſides, and a Reduction may be performed, which is ſometimes no eaſy Matter, requiring the Aſſiſtance of more than one Surgeon, as SAVIARD takes

takes notice in *Obſ.* 14. In ſome Patients who are of a weak Habit, and have had the Diſorder on them a conſiderable Time, the Rectum will ſubſide or prolapſe again after its Reduction whenever they go to ſtool: but then it may be eaſily replaced again, either by themſelves, or the Aſſiſtance of a Surgeon, who ſhould endeavour to prevent a Relapſe of the Diſorder, by ſtrengthening the Parts with proper aromatic and aſtringent Applications.

IV. It is generally more difficult to prevent a Relapſe, than to replace the Rectum. But for the firſt, it is to be attempted by the Application of two thick Compreſſes; one oblong, applied betwixt the Thighs and Nates, the other ſquare, traverſing the former upon the Anus, both which are to be retained with the T Bandage. The Compreſſes ſhould be moiſtened in ſome proper Decoction, rather than applied dry; which Decoction may be made *ex Rad. Biſtortæ, Tormentillæ cort. granator. quercus, gallis, foliis Quercus*, &c. prepared by boiling them in red Wine. The Uſe of this Decoction ſhould be alſo repeated, when the Diſorder returns upon the Patient's walking, ſtraining, or the like. When the Diſorder is ſtill more obſtinate, Relief may be ſometimes had from the Application of a ſtrengthening *Diapaſma ex Maſtic. Colophon. Terr. Japonic. Sang. Dracon.* &c. aſſiſted with a Compreſs and Bandage. For the ſame Purpoſe may be alſo uſed ſtrengthening Clyſters made of a Decoction of aromatic and aſtringent Herbs in red Wine, by the repeated Application of which the Diſorder may be generally cured. Retention.

V. If all the Means before mentioned prove inſufficient, a Suffitus may be uſed *è Maſtic. Thur. ſuccin. piper. nigro*, &c. the Fumes being conducted thro' a Tunnel in the Bottom of a Chair, forbidding the Patient aſtringent and drying Meats, and directing him to avoid ſneezing, vomiting, and all violent Exerciſe, till the Cure is confirmed. Dionis, and ſome others, think a Relapſe of the Diſorder may be prevented upon going to ſtool, if the Patient eaſes himſelf upon a Seat, which has a Hole no bigger than two Finger's Breadth, or about the Size of a Crown Piece. Some introduce a leaden Pipe into the Anus, to prevent its Relapſe. But after all, when the Diſorder has continued a long Time in a weak Habit, the Patient can frequently find no Benefit, but by a conſtant Retention with Compreſs and Bandage, which are to be conſtantly worn. Treatment of difficult Caſes.

CHAP. CLXV.

Concerning Tumors of the Anus, *ſuch as the* Condyloma, Criſta, Ficus, *and* Fungus.

I. THE lower Part of the Rectum is frequently infeſted with Tumors, as well in its external as internal Part, which, from their different Size and Figure, are diſtinguiſhed into *Condylomata, Criſtæ, Fici*, and *Fungi*. But they generally agree in this particular, that they proceed from a redundant and vitiated Blood, ſtagnating in the hæmorrhoidal Veſſels, and particularly in the Glands of this Part, whereby they are produced much in the ſame Manner as Polypus's in the Noſe. Therefore thoſe who are ſubject to the Piles, are more frequently Their Nature and Kinds.

ly troubled with them than others. These Tumors are frequently not only troublesome, but also very painful to the Patient, rendering him incapable of sitting or walking. Those Tumors of this Kind are the most malignant, which, according to CELSUS (*Lib.* V. Cap. 28. N°. 14.) are in *Locis obscœnis*, as they frequently proceed from the venereal Disease: and therefore the Ancients, who were ignorant how to cure that Disorder, denominated them to be of the worst Kind.

Treatment. II. The Cure of these Tumors may be prosecuted according to the Directions which we have before given for other Tumors and fleshy Excrescences. *Chap.* XXVII. and CL. The Root of the Tumor ought to be divided, if it be not over large, either by Ligature, the Sciffars, or Knife. If the Root is too large to be conveniently separated by Ligature, it may be performed either with the Sciffars or Knife, holding the Tumor fast with a Hook or Pliers. The Wound being permitted to bleed in Proportion to the Strength of the Patient, in order to prevent a consequent Inflammation: Then, after stopping the Hæmorrhage with proper Styptics, the Wound may be dressed, at first with scraped Lint, Compress and Bandage: but afterwards it may be proper to apply some vulnerary Balsam, desiccative Ointment, and, lastly, dry Lint, in order to cicatrize and heal the Part. But Care should be taken, in the subsequent Dressings, to remove any small Parts of the Tumor that may yet remain behind, either by cutting them off with Sciffars, or corroding them with blue Stone, or *Lapis infernalis*. I have even sometimes known a total Separation of the Tumor made by the Application of Caustics, and with good Success, if Care be taken to defend the Anus and its Sphincter from Injury. It was the Practice, or rather Advice of the Ancients, to reduce these Tumors by the actual Cautery, when they would not give way to the potential or Caustics; see CELSUS *Lib.* VI. *Cap.* 18. N°. II.

CHAP. CLXVI.

The Method of treating the bleeding Piles.

The Piles, and their Treatment. I. IN some Men the Mouths of the hæmorrhoidal Veins in the Rectum discharge a Quantity of Blood at the Anus, either at certain periodical or unstated Times, being frequently attended with Pain and Tumor of the Parts. This Disorder is by Physicians termed the *open Piles*, or hæmorrhoidal Flux; which, if moderate, is healthy, and ought not to be suppressed, since the redundant and noxious Parts of the Blood are hereby discharged from the Body, many of whose Disorders, as the Hyp, Melancholy, Madness, Gout, Asthma, *&c.* are hereby prevented or relieved, according to the Observation of HIPPOCRATES, *Sect.* 6. *Aph.* 9. and 22. CELSUS *Lib.* 6. *Cap.* 18. *N.* 9. But when too much Blood is this way lost, it weakens the Patient, and may, by Degrees, bring on a Dropsy, Cachexy, and other chronical Disorders, which may render it absolutely necessary to restrain, or at least moderate the Flux. When the Ancients found astringent Medicines insufficient for their Purpose, they cauterized the bleeding Veins with a hot Iron, in the Manner described by CULTETUS,

and repreſented in *Tab.* XLIV. of his *Armament. Chirurg.* Others tied up the Mouths of the bleeding Veſſels, by paſſing round them a crooked Needle and Thread. But the Moderns, judging the Method of the Ancients too cruel or ſevere, and often pernicious, generally leave the Caſe to Nature, except when the Diſcharge is profuſe, and then they treat the Patient not with Aſtringents, but rather with balſamic and incraſſating Medicines internally, not neglecting the Lancet, when Bleeding is neceſſary.

II. Though there are many Patients deſirous of having this Flux not only moderated, but even ſtopt, the prudent Surgeon ought not to countenance their Requeſt; before he has warned them of the forementioned Diſorders, or even Death, which they may, by this means, incur. But if they perſiſt in their Reſolution, or if the Flux exceeds its due Bounds, it may be then convenient to ſtop up ſome of the Mouths of theſe bleeding Veins, leaving only a few of them open, as HIPPOCRATES directs in *Aphor.* 22. Sect. 6. In this Caſe therefore the Treatment may be as follows: firſt, bleed plentifully by the Lancet, then give laxative or cooling Purges; and, laſtly, a Clyſter may be given five or ſix Hours before the Operation following. Palliation.

III. The Patient being properly diſpoſed upon a Bed, and his Legs held by two ſtrong Aſſiſtants, in ſuch Manner that the Surgeon may have free Acceſs and Inſpection of the Parts; he is then to tie up the bleeding Tubercles with a Needle and Thread, cutting off thoſe Parts which are preternaturally diſtended beyond the Ligature, taking Care, at the ſame Time, to leave a few of the ſmalleſt Veins open, as we before obſerved. Laſtly, if the Blood does not ſtop of itſelf after the Veſſels have bled a ſhort Time, Styptics may be then applied with ſcraped Lint, Compreſſes, and the T Bandage; and, in the ſubſequent Dreſſings, may be uſed cicatrizing and vulnerary Unguents or Balſams: and, if any thing be obſerved yet remaining, it may be removed either by the Sciſſars or Cauſtic. Sometimes theſe bleeding Tubercles are ſeated ſo high in the Rectum as to be inacceſſible; and then the Ancients recommend the paſſing up of an actual Cautery in a Cannula to reſtrain the Flux. But as this is a Practice too ſevere and dangerous, it is, in my Opinion, better to uſe the *Speculum Ani*, *Tab.* XXXIV. *Fig.* 15. whereby the Parts may be dilated ſo as to tie up or intercept the Tubercles in a Loop or Knot: by which Means, with the Application of proper Internals, a profuſe Hæmorrhage in this Part may be reſtrained, without having recourſe to that ſevere Practice of the Ancients. Chirurgical Treatment.

CHAP. CLXVII.

The Method of treating the Blind Piles.

I. IT is obſervable, that the Veins ſpent upon the Rectum and Anus are ſometimes ſo much diſtended with Blood, as to be very painful and reſemble Tubercles, either like Peas, Grapes, Wall-nuts, or Eggs, and ſometimes they are extended longitudinally like Fingers, without diſcharging any Blood. Theſe are by Phyſicians termed *Hæmorrhoides cæcæ*, or the blind Piles, which Nature of the Diſorder.

they distinguish from other Tubercles of the Anus by their Colour and Resistance to the Touch; for these, being distended with thick Blood, appear livid, and, being pressed with the Finger, feel like little Bladders distended with some Liquor: which two Circumstances are not observed in the other Tubercles of this Part, considered in *Chap.* CLXV. Sometimes these distended Vessels are soft and flaccid, giving little or no Pain: others are tense, painful, and inflamed, tormenting the Patient often to such a Degree, that he can neither sit, stand, nor walk, often fainting with the Extremity of Pain, and more afraid than in real Danger of Death.

Causes and Prognosis. II. The blind Piles most frequently occur in those Men who are costive, and of a sanguine plethoric Habit; to which we may add in Women, an Obstruction of the Vessels from any Pressure of the Infant in Gestation, or Suppression of the Menses. These distended Veins become at last so turgid, as to burst, and discharge their Contents, and then they are no longer the *Hæmorrhoides cæcæ*, but *apertæ*, sometimes bleeding to such a Degree, as greatly to endanger the Patient's Health. In the blind Piles the Parts are sometimes so much distended, and the Pain so intense, as to cause a Spasm or Cramp of the Sphincter-muscle, which is sometimes so forcibly contracted with excruciating Pain, as not to admit even the Administration of a Clyster. Sometimes these distended Vessels, if their Contents are not dispersed in four or five Days time, degenerate into troublesome and itching Ulcers, and not unfrequently do they give Birth to an Abscess, or a stubborn Fistula.

Treatment. III. When the blind Piles are small, and not very troublesome, they need not the Care of the Surgeon: but when they are numerous, or large, incompassing the Anus like Grapes, and by their Pain molesting the Patient, so that he can neither sit, ride, walk, or go to stool; in that Case, unless they yield to the Application of Spirits of Wine, the most speedy Remedy is to make a Ligature upon those which are most painful and large, whereby they will in Time separate. But if there is also a violent Inflammation, it will be first proper to bleed, and to use cooling and laxative Medicines internally, with a proper Diet, while externallly may be applied discutient and emollient Fomentations and Cataplasms. The Patient may be sometimes eased by anointing them with *Ung. Nutrit.* fresh Butter, Oil of Almonds, *&c.* and frequently the Application of Linen Rags, dipped in warm Spirit of Wine, with emollient Clysters, are highly serviceable. If they do not take effect, Leeches may be applied to the turgid Veins, in order to remove their Tension, and discharge their Contents, which may be also effected by Scarification with a Lancet, when the Parts are either inflamed, or Leeches are not at Hand. Then, after letting them bleed in Proportion to the Patient's Strength, the Dressings may be made with scraped Lint, Compresses, and the T Bandage, which are to be renewed every Day, as long as the Disorder continues. What speedy Relief may by this way be had, no one can imagine but those who have experienced. Sometimes the Piles are seated so far within the Rectum, as to be inaccessible without dilating the Sphincter by the *Speculum Ani*, *Tab.* XXXIV. *Fig.* 15. and, upon their appearing, by the Help of this Instrument, they may be either scarified with a Lancet, or divided with the Scissars, in order to discharge their thick Blood, which will abate the Inflammation, Tumor, and Pain.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

Fig. 10.

Fig. 11.

Fig. 12.

Fig. 13.

Fig. 14.

Fig. 15.

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Pain. Sometimes, by this Treatment, the blind will turn to the open, or bleeding Piles, attended with a conſiderable Flux, which, however, ought not to be ſuppreſſed when within the Bounds of Moderation, as it may conduce much to the Patient's Health, and the Prevention or Removal of many obſtinate Diſorders, ſuch as the Gout, Gravel, hypochondriacal Melancholy, *&c.* Upon which Account many Phyſicians recommend and excite this Evacuation: but as it muſt be attended with many Inconveniences, and often bad Conſequences, I ſhould rather approve of promoting the Cure of thoſe Diſeaſes by other Evacuations.

IV. In order to prevent or relieve the blind, or the bleeding Piles, nothing is more conducive than a ſpare and temperate Diet, with Bleeding, Spring and Fall, and oftner if required. Internally may be taken a Powder or Decoction *ex Millefol.* drank like Tea, carefully avoiding every thing which heats the Blood, and conſtipates the Bowels; of which kind are Aloes, Myrrh, Saffron, *&c.* with Wine, Anger, violent Exerciſe, profuſe Venery, and Riding, *&c.* Upon the firſt Appearance of the Piles with any Uneaſineſs, cooling and diluting Medicines ſhould be immediately employed with Laxatives and proper Diet, while externally may be uſed Fomentations and Cataplaſms, and, in urgent Caſes with moſt acute Pains, Leeches, or Scarifications with the Lancet, as we before adviſed. Prevention.

An EXPLANATION *of the* THIRTY-FOURTH PLATE.

Fig. 1. Repreſents the *Uterus* with a *Mola* adhering thereto, as they were obſerved by SIGISMUNDA, in a Lady, from whom that expert Midwife extirpated the foreign Body with Succeſs by a Pair of large and obtuſe-pointed Sciſſars. See her Treatiſe *de Arte obſtetricandi*, in Præf.

Fig. 2. Exhibits a *Prolapſus Uteri* without Inverſion. A A denote the Pudenda; B the Uterus appearing externally; C the internal Mouth of the Uterus, which here appears on the out-ſide the Pudenda.

Fig. 3. Shews a *Prolapſus Uteri* with an Inverſion thereof. A A the Pudenda; B the inverted Uterus hanging down, without any Appearance of its internal Mouth ſhewn by C in the preceding Figure; which, together with this, are taken from RUYSCH. C here denotes the lower Part of the inverted Uterus.

Fig. 4. Repreſents a particular Kind of *Prolapſus Uteri*, as it was firſt denominated; though it was in reality no more than a Prolapſus of the *Vagina*, according to the Obſervation of WIDENMANNUS *in Ephem. Nat. Curioſ. Cent.* VIII. *Obſ.* 98. where the Hiſtory of the Caſe is more largely delivered, and the Figure of the Parts as big as the life. In our Figure A A denote the *Labia Pudendi*; B B the Nymphæ; C the Clitoris lodged betwixt the two former; D D D the prolapſed Vagina, reſembling indeed the Uterus, but in reality no more than a Tumor formed by the Relaxation and Subſidence of the interior Coat of the Vagina; E its Root in the Vagina; F its Baſe with the Mouth reſembling the internal *Os Uteri*; G, H, the Uterus itſelf ſeated in the Pelvis. We take no notice here of the Ligaments, Fallopian Tubes, and *Ovaria*, being impertinent to our Deſign.

Fig. 5. Is taken from the Chirurgical Obſervations of MEEKREN, to ſhew a Prolapſus of the Vagina and Uterus together. A the Uterus; B its Neck; C its internal Mouth; D the Pudenda; EE the Vagina divided and laid open; F the Root of the Tumor appearing without the Vagina like a *Prolapſus Uteri*; G the Ligature with which the Root of the Tumor was compreſſed during its Removal.

Fig. 6, 7, 8, 9, and 10. Repreſent ſeveral Sorts of Peſſaries: the firſt of which is round like a Ring, to which are faſtened Strings for extracting it out of the Vagina. That at *Fig.* 7. is of an Elliptic or oval Figure, at *Fig.* 8. quadrangular, and at *Fig.* 9. triangular; each of them being perforated in the Middle, and formed out of Cork or Wood waxed over, or elſe of Silver or Gold made hollow, for the more opulent. The laſt of them at *Fig.* 10. is ſolid like an Egg, but leſs convenient than the former.

Fig. 11. Is an elaſtic Peſſary of Steel-wire, turned into a conical Worm as deſcribed by GOELICKIUS. This has alſo a String faſtened to it; but if there was another fixed to the oppoſite Side, it might be drawn out ſo much the more eaſily.

Fig. 12. Repreſents the Machinery commonly uſed with the *German* and *Dutch* People for injecting Clyſters. AA the Bladder of Liquor, which is large enough to hold a Pint; BB the Pipe of Bone or Ivory to tranſmit the Liquor into the Inteſtines; CC the Ligature immediately above the Pipe, which is to be united when the Pipe is in the Patient's Anus; DD the Ligature which ſecures the Orifice, whereby the Clyſters was poured into the Bladder.

Fig. 13. Exhibits the Machine for giving a *Clyſma fumoſum* of Tobacco. A the Braſs Bowl or Capſula in which the Tobacco is burnt; B the Ivory Pipe to be paſſed into the Anus; C the Pipe, which, being in a Perſon's Mouth when the Tobacco is on Fire, the Smoke E is thereby blown through the flexible leathern Pipe DD into the Patient's Bowels.

Fig. 14. Denotes a Braſs Pipe for conveying Fumes or Vapours into the Vagina and Uterus. A the upper Part, which is full of ſmall Holes, and to be inſerted into the Vagina. B the lower Part, open, for receiving the Pipe of the Funnel.

Fig. 15. Is a *Speculum Ani*, or Inſtrument to dilate and inſpect the Anus and Vagina in Diſorders of thoſe Parts. It conſiſts of a hollow Cone or Beak, whoſe two Sides are marked A A and B B, which, being gently warmed and lubricated with Oil, are then paſſed into the Anus or Vagina; and, by preſſing together the two Handles C and D, the Sides of its Cone are thereby gradually ſeparated, and dilate the Parts for Inſpection; E the Hinge, is in Manner of GINGLYMUS.

CHAP. CLXVIII.

Of Fiſtulæ *in the* Anus.

I. THOSE Ulcers in or near the Anus and Rectum, which are recent, and afford a *pus laudabile*, or uniform Matter, are termed Abſceſſes: but thoſe which are more inveterate, callous, and afford a thin fœtid Matter, ſuch have been generally denominated Fiſtulæ by the Ancients, and are diſtinguiſhed by them into various Species, according to their different Symptoms [a]. Some Fiſtulæ of the Anus are ſmall and recent; others are narrow, and penetrate deep; and others, again, are inveterate, and ſo large, that having deſtroyed the Skin and Adepts, they expoſe the Rectum to View. Sometimes a recent Fiſtula has no great Calloſity; only the Margin of its Entrance is a little indurated. Sometimes the Fiſtula proceeds in a ſingle and ſtraight Courſe; and ſometimes, it is crooked, and, in a Manner, divided into Branches. But before we proceed to a further Examination of this Diſorder in all its Species, we ſhall firſt diſtinguiſh three Kinds of theſe Fiſtulæ remarked by the moſt expert Surgeons. Of the firſt Kind are thoſe which do not perforate the Anus or Rectum, but have only a ſingle or double Opening externally near the Anus, by which they diſcharge a thin fœtid Matter, and are incompaſſed with callous Lips. And theſe are called external Fiſtulæ. To diſcover how deep, and what Parts the Sinus of the Fiſtula penetrates, a Search is to be made with the Probe, and one of the Fore-fingers, paſſing the firſt into the Sinus of the Fiſtula, and the other, lubricated with Oil, into the Anus; by which Means the Probe, preſſing againſt the Finger, will diſcover whether there be any opening into the Inteſtine, or how thick the intermediate Partition remains [b]. Sometimes the Fiſtula is ſo crooked, that the Probe cannot follow it [c]; and ſo we cannot be ſatisfied, whether the Sinus is deep or ramified: in this Caſe therefore it may be proper to inject the Fiſtula with warm Milk by a Syringe, obſerving how much it contains, and whether any of it eſcape into the Rectum, which will diſcover whether the latter be perforated or not. The ſecond Kind of Fiſtulæ are thoſe which have ſeveral Openings, and at leaſt one of them perforating the Rectum, the reſt terminating outwardly near the Anus, as repreſented in *Tab.* XXXV. *Fig.* 1. CC; And that the Inteſtine is thus perforated, the Surgeon may be ſatisfied, if the Head of the Probe touch his Finger in the Patient's Anus, without any intervening Subſtance; or if, on the other Hand, a Clyſter or Milk being injected by the Anus, ſome Part of it eſcapes through the external Orifice of the Fiſtula, through which the Fæces, Flatus, and Worms are alſo ſometimes diſcharged. The third and laſt Kind of Fiſtulæ in the Anus, are thoſe which perforate the Rectum internally without any exterior Opening, as is repreſented in the forecited *Fig.* FG. Which laſt Kind are denominated occult, blind, or

Diagnoſis and kinds of Fiſtulæ.

[a] See HIPPOCR. *Lib. de Fiſtulis*; and CELSUS, *Lib.* VII. Cap. iv. Sect. 4.

[b] Which has been obſerved by ÆGINETA, *Lib.* VI. Cap lxxviii.

[c] The Finger ſhould always be firſt paſſed into the Anus in probing a Fiſtula; or elſe you may be in Danger of perforating the Rectum when there is no opening into it.

imperfect

imperfect Fiſtulæ; the two former Kinds being tumid, manifeſt, or compleat. The occult Fiſtulæ are diſcovered by a Diſcharge of purulent, or corrupt Matter by the Anus, the Patient being ſenſible of a Hardneſs, Tumor, and Pain, without any external Opening near the Rectum. The internal Opening of the Fiſtula is generally near the Sphincter of the Anus; but ſometimes they open ſo high into the Rectum, as to be both inviſible and inacceſſible, both which may be ſeen in *Tab.* XXXV. *Fig.* 1. But whatever be the Condition of the Fiſtula, its opening ſhould be ſearched for with the Finger *in Ano*, lubricated with Oil or Butter: and when that is inſufficient, may be uſed the *Speculum Ani*, or other convenient Inſtruments. But when the Sinus of the Fiſtula gives ſome external Mark, either by Tumor, Hardneſs, or the like, the Surgeon need not, in that Caſe, give himſelf much Trouble in ſearching for the internal Opening.

Other kinds of Fiſtulæ.

II. Thoſe Fiſtulæ which perforate the Inteſtine with one Aperture, and appear externally with another, are uſually termed perfect or compleat; while thoſe which have but one opening are termed imperfect or incomplete. This laſt kind of Fiſtulæ are again diſtinguiſhed by the Difference of their Opening into external and internal. Fiſtulæ are again diſtinguiſhed into ſimple and compound. Of the firſt kind are thoſe which perforate only the Integuments and Inteſtine: and of which ſome incline to one Side of the Nates; others, forward, to the Perinæum, Urethra, Bladder, or Scrotum; and others again, backward, to the *Os coccygis* or *ſacrum*. The Compound are thoſe which eat into the *Os ſacrum*, or *coccygis*, Bladder [a], Urethra, Scrotum, and in Women the Vagina, to ſuch a Degree, that the Fæces of the Bladder and Inteſtines are frequently intermixed or confuſed; and ſometimes the Sinus of the Fiſtula penetrates into the Cavity of the Abdomen, which is of all the very worſt kind. Some Fiſtulæ are ſmall, and very tolerable, with little or no Uneaſineſs; while others are ſo extremely painful as to excite a Fever, or by their too copious Diſcharge, extenuate and deſtroy the Patient. But when the Diſcharge is moderate, it may be ſometimes ſerviceable in preventing other Diſorders; as I remember lately in a Man, whoſe Fiſtula being cured, he fell ſick of the Gout, of which he was again freed upon its being opened. Some Fiſtulæ have their Openings ſo very ſmall, as to be ſcarce diſcernible either with the Probe or otherwiſe: and ſome, again, have different Appearances, taking either an oblique Courſe, or paſſing in a ſtraight Direction, either ſingle or ramified, deep or ſuperficial, *&c.* So that it is frequently no leſs difficult to diſcover all the Circumſtances of this Diſorder, than to accompliſh its Cure.

Exploration of theſe Fiſtulæ.

III. In order to probe and examine a Fiſtula of the Anus, the Patient is to be firſt diſpoſed in a proper Poſture; and, after diſtending and holding the Nates aſunder by an Aſſiſtant, the Surgeon then introduces his Fore-finger, lubricated with Oil or Butter, into the Patient's Anus; always obſerving this Caution, not to paſs his Probe far into the Fiſtula before he has thus introduced his Finger. Otherwiſe, he might be in Danger of making a Perforation into the Inteſtine, by preſſing too forcibly with his Probe upon a weak or extenuated

[a] *Fiſtulæ* penetrating into the Urethra and Bladder have been obſerved, long before myſelf, by Albucasis, Part II. Chap. lxxx.

Part.

Part. When the Probe is thus preſſed, the Nates ſhould reſume their natural Situation, that the Angles of the oblique Sinuſes may not impede the Progreſs of the Probe: and when thus cautiouſly depreſſed, and gently turned round on every Side, it meets with a Reſiſtance, we may reaſonably conclude there terminates the Fiſtula.

IV. The moſt general Cauſe of this Diſorder is uſually an Ulceration or Abſceſs, formed in the Piles in or near the Rectum, and eſpecially in the large Quantity of Fat, which inveſts that Inteſtine. But ſometimes the Cauſe of ſuch an Abſceſs may be a Contuſion or Wound from a Fall, or Blow, an Inflammation, Dyſentery [a], difficult Birth [b], immoderate Riding on Horſeback, the Venereal Diſeaſe, and many other of the like Cauſes. It has been an Obſervation made by many of the Camp-Surgeons and Phyſicians, that Troopers, or the riding Part of an Army, are very frequently troubled with this Diſorder, eſpecially after long Marches in hot Weather. An Abſceſs thus formed may degenerate into a Fiſtula, by the Neglect and Baſhfulneſs of the Patient, eſpecially if it be not timely opened and cleanſed from its foul Contents; by the Retention and Acrimony of which the adjacent Fat and Inteſtine are at length corroded or ulcerated; and, in proceſs of Time, become callous, and indurated ſo as to be incurable by any Means without the Aſſiſtance of the Knife. A remarkable Inſtance of which we have in the *French* King *Lewis* XIV. who could not be cured by all the Skill and Endeavours of the moſt expert Surgeons and Phyſicians, till he was cut. Therefore the Knife ſhould be immediately applied to diſcharge the Contents of an Abſceſs in Time, or even when there is Matter perceived in an Inflammation, either by feeling with the Finger internally, or by its pointing externally. Their Cauſes and Effects.

V. The Cure of this Diſorder is the more difficult, as the Fiſtula is larger, deeper, and has conſumed the Fat, with Part of the Rectum and its Sphincter-Muſcle; and as its Sinus is more callous, and the Patient weak [c], or advanced in Years: which, when they all concur together, may render the Caſe deſperate and incurable. In particular, the Fiſtula is more dangerous as its internal Opening is ſeated higher up in the Rectum, where the Blood-veſſels are very large, ſo that the Operation of cutting may induce a fatal Hæmorrhage, as hath been ſometimes obſerved [d], it being hardly poſſible to tie up the Veſſels, or ſtop their Bleeding by the Preſſure or Reſiſtance of ſome hard Body, or by the Application of Styptics. And, to ſay the Truth, if the internal Orifice of the Fiſtula is not within Reach of the Finger, the Operation of cutting cannot well be performed without hazarding the Life of the Patient; and without that Operation there are but little Hopes of obtaining a Cure: ſo that Garengeot judiciouſly adviſes the Surgeon in this Caſe, to refrain from the Knife, which might incur a fatal Hæmorrhage. And ſometimes, even when the Operation Prognoſis.

[a] As Marchetti has obſerved in *Lib. de Fiſt.*

[b] See Tulpius *Lib.* IV. Cap. xl.

[c] Saviard gives us the Hiſtory of a weak Patient, who died the Day after the Operation, in his *Obſ.* 50.

[d] See Saviard *Obſ.* 49. And Palfyn, (*Cap.* XX.) gives us an Inſtance, in which there was no Blood diſcharged from the Wound, but it all paſſed into the Patient's Inteſtine, ſo that he bled to death.

has

has been performed, we find ſo many and ſo deep Fiſtulæ, affecting either the adjacent Bone, Bladder, Urethra, or Vagina, in ſo deſperate a Manner, as to render the Succeſs thereof very doubtful and precarious. Abſceſſes of the Anus, which frequently return again, are to be cured in the ſame Manner with Fiſtulæ; that is, by dividing the Anus or Rectum with the Sphincter-muſcle. In a Woman with Child a Surgeon ought not to undertake the Cure of a Fiſtula *in Ano* till ſhe is firſt delivered; otherwiſe he may be the Occaſion of her Miſcarriage and Death, as MAURICEAU obſerves: and if the Fiſtula penetrates into the Bladder, Uterus, Urethra, or the adjacent Bones, the Diſorder hardly ever admits of a Cure. The blind or occult Fiſtulæ are alſo much harder to Cure than the manifeſt or external and compleat. But, on the contrary, if the Fiſtula be recent and external only, or even compleat, as in *Tab.* XXXV. *Fig.* 1. CC, the Cure may probably ſucceed, provided there is but a ſmall Portion of the Fat, Rectum, or its Sphincter conſumed; the Sinus being ſimple, with little or no Calloſity, and affecting none of the conſiderable Parts beforementioned; and particularly, if at the ſame Time the Patient be young, and of a good Habit: but even then the Cure is to be expected more from the Knife, than the Application of Medicines. The ſame Judgment is to be alſo formed of the occult or internal Fiſtulæ, which open not far from the Sphincter-muſcle, as in *Fig.* 1. F G. Small Fiſtulæ, which open externally, may be continued to Advantage, and without much Trouble to the Patient, in ſuch Habits as have been long accuſtomed to a Diſcharge of pernicious Humours thereby; ſo that by keeping them open with a proper Regimen, the Patient ſometimes acquires a healthy old Age, as we have obſerved in treating of Ulcers. When an external Fiſtula or Abſceſs has ſo conſumed or extenuated the Inteſtine, as to leave but a very thin Partition between the Cavity of the Fiſtula and Inteſtine, the Diſorder is not then curable without dividing the Sphincter and Rectum, as we ſhall preſently direct, notwithſtanding the Inteſtine be imperforated by the Ulcer or Fiſtula [a]. But if the Partition or Sides of the Inteſtine appear thick and firm, a Cure may be then ſometimes obtained without the Operation of cutting. Recent Fiſtulæ, when they proceed from, or are accompanied with the venereal Diſeaſe, are generally cured by the Uſe of Mercury [b], without cutting.

Preparation and Poſture of the Patient.

VI. Having deſcribed the Nature and Kinds of Fiſtlæ in the Anus, we ſhall next proceed to deliver an Account of the Preparation, or Things previouſly neceſſary to their Treatment and Cure. We ſhall begin with the perfect or *compleat* Fiſtulæ, as they are introductory to the reſt. For the Cure of a compleat Fiſtula, indicated and encouraged both from its own Nature, and the Patient's Health and Habit of Body, *&c.* (as at *Sect.* V.) the firſt thing to be done here by the Phyſician or Surgeon, is to prepare the Patient to receive ſo great a Change, and particularly by Bleeding and Purging a few Days before the Operation: but in weak Habits, they ought to be omitted, and the Patient rather ſupported with a ſtrengthening Diet, and Exhibition of Alteratives, to correct the State of his Juices according as they are indiſpoſed. A few Hours

[a] As SAVIARD takes Notice in *Obſ. Chirurg.* 49.
[b] See LE DRAN, *Obſ.* 85.

before

before the Time fixed for the Operation, a Clyſter ſhould be adminiſter'd to empty the Inteſtines, that their Contents may neither offend the Operator, nor the future Diſcharge of them make it neceſſary to take off all the Dreſſings before the due Time; and, in the next Place, the Patient ſhould make water a little before the Operator begins, that the Bladder by its Diſtenſion may not impede the Operation, nor be itſelf liable to be injured. As for the Poſture of the Patient, it may nearly coincide with that for probing the Fiſtula at *Sect.* III. lying in a prone Poſture with his Thighs divaricated. Indeed the Ancients, and particularly ÆGINETA, recommend a ſupine Poſture: and the modern *French* Surgeons, according to the Account of GARENGEOT, prefer diſpoſing the Patient in the ſame Manner as for a Clyſter, lying upon his Side near the Edge of the Bed, with his Thighs drawn up towards his Abdomen. But though this Poſition may be convenient enough, in many Caſes, for performing the Operation, yet I have ſeveral Times found, that the particular Diſpoſition and Courſe of the Fiſtula rendered the firſt Poſture moſt convenient, both for examining and cutting the ſame.

The Operation for compleat Fiſtulæ.

VII. When the Patient is fixed in a convenient Poſture, the Surgeon's next Buſineſs is to chuſe a fit Inſtrument for performing his Operation; which, among the Ancients, was a particular Sort of Knife, in the Form of a Sickle, denominated (from the Diſorder and its Office of cutting) by the *Greeks*, *Syringotomus*. The moſt uſual Kinds of this Inſtrument are repreſented in *Tab.* XXXV. *Fig.* 4, 5, 6, 7. where AB denote the ſharp Edge of the Inſtrument for cutting, BC the obtuſe or Probe End of the Inſtrument, which ought to be flexible, DD the obtuſe Back of the ſame Inſtrument, which is convex. Notwithſtanding theſe Inſtruments are rejected as uſeleſs by many of the Moderns, I am yet convinced, by Experience, that they may be frequently uſed to Advantage for cutting thoſe Fiſtulæ, which do not run deep, or are only ſuperficial. When a *Syringotomus* has been choſe ſizeable to the Depth of the Fiſtula, in order to uſe it, the Fore-finger of either Hand is to be firſt lubricated with Oil, and paſſed into the Rectum; and then the Probe End of the Inſtrument, marked C, is thruſt in at the external Aperture of the Fiſtula, till it reaches the Finger *in Ano*, whereby it is to be alſo inflected, and brought out again at the Anus: after which, taking hold of each End of the Inſtrument, it is to be drawn forward, ſo as to divide the intercepted Parts of the Anus and Rectum; by which Means too the Sphincter Muſcle may be divided without Damage to the Patient. (See SCULTETI *Tab.* XLV.[a]) But as the ſuperior Aperture of the Fiſtula in the Rectum is generally callous, which Calloſity cannot be removed in this Method of cutting, and as without that there can be no Cure performed; it may be therefore proper, in ſuch a Caſe, (either then, or the next Day, if there be a great Effuſion of Blood) to cut the Remainder, which is higher up in the Inteſtine, with a pair of Sciſſars.

More modern Inſtruments for cutting.

VIII. But ſome of the more modern Surgeons think, that the falciform Knife with an obtuſe Point (repreſented in *Tab.* V. *Fig.* 3.) may be more ad-

[a] There are many, who imagine [after ALBUCASIS, Part II. Cap. lxxx. and the Ancients] that a Diviſion of the Sphincter-muſcle will be attended with an involuntary Diſcharge of the Fæces; but repeated Experience aſſures us, that, on the contrary, the Muſcle may be ſafely inciſed, and healed, without being attended with any ſuch Conſequence.

vantageouſly uſed for cutting Fiſtulæ in this Part. But I cannot be entirely of their Opinion: for Experience aſſures us, that it can be only uſed with Succeſs in Fiſtulæ which are ſuperficial, and which do not run deep. In ſuch Fiſtulæ I have indeed happily uſed this Sort of Scalpel, and it was with one of the ſame Kind, having a Button at the End, that the *French* King was happily cut, and cured; whence it has been denominated *Biſtouri Royal*. But, as I obſerved, neither this Scalpel of ours, nor that uſed upon the *French* King, can be advantageouſly uſed in deep Fiſtulæ. We are therefore obliged to the celebrated Surgeon M. Bassius of *Hall*, for the Publication of a new Scalpel for this Purpoſe; (See *Tab.* XXXV. *Fig.* 8.) in a Treatiſe *de Ani Fiſtula*, *Halæ* An. 1718. which Scalpel he deſcribes armed with a long and flexible Point of Silver. The Beak of this Inſtrument, marked C, is to be paſſed in the Fiſtula, and brought out at the Anus, in the ſame Manner as directed before in the preceding Section. For this Operation of cutting Fiſtulæ in the Anus, may be alſo commodiouſly uſed the *Syringotomus* in Part deſcribed by Garengeot, and repreſented here in *Tab.* XXXV. *Fig.* 3. the Management of which is alſo like the preceeding: but it may be better held and guided by the Handle E E; and, as the long Beak C D is incommodious, I have contrived another protracted only to F, which I find to perform its Office more conveniently. But in all theſe various Methods of Treatment, when the Inciſion is made, we muſt dreſs firſt with dry Lint, Compreſſes, and the T Bandage. And in the ſubſequent Dreſſings the callous Lips muſt be gradually taken off by corroſive Applications, particularly red Precipitate; and the Wound afterwards healed with *Balſam. Copaivæ*, or the like.

Other Methods.

IX. There are ſome, who paſs a flexible Silver-wire through the external Aperture of the Fiſtula, inſtead of the Probe-End of the forementioned Inſtruments; which Wire they bend and draw through the Rectum and Anus, as in *Tab.* XXXV. *Fig.* 1. D D, and then joining and drawing the two Ends of the Wire tight together, they divide the fleſhy Parts which it intercepts, marked C C, B E, with a falciform Inciſion Knife. This Method, which was formerly ſtarted by Ægineta, is ſo much in Favour with Garengeot, that he thinks it more likely than any of the reſt to prevent a Return of the Diſorder: but by what means it can make any ſuch Prevention, I am ignorant, notwithſtanding its Recommendation from Antiquity. Others, again, uſe a flexible and grooved Probe or Director, *Tab.* I. *lit.* M. or *Tab.* XXXV. *Fig.* 2. which being paſſed into the Fiſtula, and inflected ſo as to come out of the Anus, they then divide the intercepted Parts, by cutting into its Groove with a Scalpel or Sciſſars; which Method is cried up by the Moderns, as preferable to all others in deep Fiſtulæ: but in what it excels them, I know not. But in whatever Method the Patient is to be cut, the Surgeon ſhould do it with great Care and Circumſpection, to avoid wounding any of the larger Blood-veſſels in the Rectum, which, in deep Fiſtulæ, might occaſion a fatal Hæmorrhage[a]. After the Parts are inciſed, they ſhould be cleanſed from their Blood, and the State of the Wound examined, to obſerve if there are Sinuſes, and callous or corrupt Parts, which lie as yet concealed; that ſuch Parts may be afterwards laid open, and further

[a] As Saviard remarks in *Obſ.* 49. and Palfyn *Operat. Chirurg.* Cap. 20.

inciſed

inciſed by the Scalpel and Finger, or Probe and Sciſſars. But if the Weakneſs or Timorouſneſs of the Patient forbid the Surgeon to lay the whole open in this Manner at the firſt cutting, as is frequently the Caſe, yet he ſhould not neglect to do it afterwards; taking Care to cut off the moſt callous Parts, if poſſible, and to ſcarify the reſt, by cutting either with the Scalpel or Sciſſars, as may be moſt convenient. By this means a more ſpeedy and copious Suppuration will be induced; and the indurated, or corrupt Parts, will be the ſooner removed by eſcharotic and detergent Medicines. And, to ſpeak the Truth, the Mundification and Agglutination of the Wound can never more happily or ſpeedily ſucceed, than when all the callous and corrupt Parts have been exactly removed by the Knife or Sciſſars.

Rungius's Method deſcribed.

X. I had another Method of performing this Operation with different Inſtruments communicated to me by Rungius of *Bremen*, while I reſided there to attend ſome Patients for the Stone. He uſes three Inſtruments, which are no where elſe deſcribed. The firſt is a grooved Probe or Director made of Steel or Silver, a lateral View of which you have *Tab.* XXXV. *Fig.* 9. CD is the Handle, which is bent outward at E, ſo as to form an obtuſe Angle. The Groove of the ſame Inſtrument is repreſented directly to the Sight in *Fig.* 10. His ſecond Inſtrument is a Silver or Steel Cannula, about the Thickneſs of one's Finger, with a crooked Handle, as in the preceding, but in an oppoſite Direction, as repreſented in *Fig.* 11. AB. The Cavity of this is ſhewn more directly to the View in *Fig.* 12. His third and laſt Inſtrument, a Scalpel with a long and narrow Blade, *Fig.* 13. For the Uſe of theſe Inſtruments let us ſuppoſe a Fiſtula in the left Side of the Anus, as at *Fig.* 1. CC. The Cannula (*Fig.* 11. AB.) being firſt dipped in warm Water, and then lubricated with Oil, is next paſſed into the Rectum, and its Handle D given to be held firm by a prudent Aſſiſtant. Then the Operator takes the grooved Probe (*Fig.* 9.) warmed and lubricated like the former, and paſſing it through the external Aperture of the Fiſtula, and obliquely through its interior Orifice into the Rectum, conducts its Point ſo as to enter the Cannula, preſſing it hard againſt the ſame: That it has entered the Cannula, he perceives partly by the Ear, and partly by feeling with the Finger *in Ano*. He then holds the Probe or Director in his left Hand; while, with his right, he takes the Scalpel, *Fig.* 13, and paſſes it along the Groove of the Director to the Cannula; by which means he divides the Fiſtula in a Direction outward from the Inteſtine, conducting the remainder of the Treatment and Dreſſing, as before. This Method ſeems to be preferable to the reſt for deep Fiſtulæ, becauſe the End of a *Syringotomus*, or even of a Probe, cannot in ſuch be eaſily inflected, and brought out again through the Anus, without the Hazard of lacerating and injuring the Parts. But even this requires the utmoſt Precaution, to prevent the Knife from ſlipping beſide the Cannula, ſo as to avoid wounding the Rectum, and adjacent Parts; for which Reaſon the Cannula, *Fig.* 11. is made thus large. When the Fiſtula is on the right Side, the Inſtruments muſt be applied in a contrary Direction. I am ſenſible that a Method was propoſed by Massier before Rungius, for cutting Fiſtulæ of this Part by paſſing a ſtraight Cannula into the Anus, and cutting either with a direct or crooked Scalpel; which I alſo remember to be a Practice recommended by Raw in his *Chirurgical* Demonſtrations. But this Method of Rungius

appears the moſt convenient, and the beſt adapted to avoid the Injuries which may attend the others.

Treatment of external and ſuperficial Fiſtulæ.

XI. If a Fiſtula or Abſceſs be recent and ſuperficial, terminating in the Skin and fat Membrane, without penetrating the Sphincter *Ani* or Rectum, it ſhould then be firſt enlarged or dilated, (if narrow, as is generally the Caſe) by inſerting Tents made of prepared Spunge, or of Gentian, and other Roots, which gradually ſwell, and extend the Parts by their imbibed Moiſture. When a ſufficient Opening is this way obtained, the Parts are to be firſt cleanſed with Eſcharotics and Detergents, and then conſolidated, or healed, according to the Directions which we have before given for Fiſtulæ in general (in Part I. Book V. Chap *on Fiſtulous Ulcers.*) But, in many Caſes, it is moſt adviſeable to dilate immediately with the Knife or Sciſſars, dividing the incumbent Skin and Fat by a ſimple Inciſion; which muſt alſo be the Method when Tents do not prove ſufficient to make a proper Opening, for the Removal of what is become callous. For the firſt Dreſſing, it may be ſufficient to dilate the Fiſtula with dry Lint; and, at every ſucceeding Dreſſing, if more Sinuſes appear, they muſt be laid open, and deterged as before. The callous, indurated, and foul Parts may be gradually removed at every Dreſſing, partly by the Knife and Sciſſars, and partly by the Uſe of Eſcharotics, (particularly *Merc. præcip. rubr.*) applied where the firſt cannot conveniently reach. When the vitiated Parts are thus removed, you may dreſs with ſome digeſtive Ointment, as *Ung. Apoſtolor. cum. ol. ovor.* and when the Sanies, or thin Ichor, diſcharged from the Fiſtulæ, changes its diſagreeable Smell, Colour, and Conſiſtence for that of a thick uniform Matter, its Cavity filling up with new and ſound Fleſh; there then remains nothing more to do than to heal and cicatrize with ſome vulnerary Balſam, and the daily Application of *Sp. Vini*, *Aqu. Calc.* and, at the end, of dry Lint only. Sometimes a ſmall Tubercle appears inſtead of an external Opening in theſe Fiſtulæ, and, upon a ſtrict Survey of the Tubercle, it appears perforated with a ſmall Pin-hole leading to the Sinus of the Fiſtulæ: and in this Caſe too, the ſmall Track is to be laid open, and followed to the Extremity, removing the Calloſity, deterging and healing as before.

Treatment of the deeper Fiſtulæ.

XII. But if the Fiſtula has ſo far penetrated as to enter the Rectum, Anus, or its Sphincter, or ſo as to make the Side of the Inteſtine very thin; the Caſe will then hardly ever admit of a Cure without the Operation of perforating and cutting the Inteſtine, together with the Sphincter, as we before obſerved. Therefore to cut a Patient for a Fiſtula of this Nature, the Surgeon, having fixed him in a proper Poſture, firſt introduces his Fore-finger into the Anus, and then paſſes a Probe, or the Probe end of a *Syringotomus*, (*Tab.* XXXV. *Fig.* 5.) down to the Bottom of a Fiſtula towards the Rectum, making a Perforation into it againſt the End of his Finger; but in ſuch a Manner as to avoid injuring any other Part of the Rectum, Bladder, *&c.* He then inflects the End of the Inſtrument which perforated the Inteſtine, and brings it down through the Anus, thereby dividing the Parts, as we before directed at Sect. VII. VIII. and IX. preceding. And thus an incompleat Fiſtula is converted into a perfect or compleat one. When a Fiſtula near the Anus tends towards either Side of the Perinæum, rather than to the Inteſtine itſelf, it is then adviſeable to lay it open by Inciſion, deterging and healing as before. Laſtly, in dividing deep Fiſtulæ

of

of these Parts, it may be proper to pass a Cannula like that at *Fig.* 11. *Tab.* XXXV. and then to incise with the Scalpel *Fig.* 13, but cautiously, to avoid injuring any other Parts.

Treatment of blind Fistulæ.

XIII. The third Class of Fistulæ in the Anus, are those termed occult or blind, opening only into the Intestine internally. These can never be cured without making an Opening by an external Incision to come at the occult Sinuses. The most convenient Part for making this Incision may be known either from its appearing with some Tumor, Hardness, Pain, or Redness and Inflammation; and especially if, at the same Time, the Finger perceives a Sinus, or soft Matter, like an Abscess under the same Part. When the Part to be incised is detected by the forementioned Signs, the Apertion thereof may be performed with a Scalpel or Abscess Lancet, the Patient being secured in the Posture before described for cutting a Fistula; and for the greater Safety, to avoid injuring the Rectum, or adjacent Parts, the Index may be passed in the Anus, in order to press the Tumor outward during its Incision. By this means you are to convert an imperfect into a compleat Fistula, to render the Cure thereof more practicable and certain: and, after the Apertion made, it may be further enlarged according to the Necessity of the Case, with an Incision-knife, either upon the Finger, or in a Director; carefully removing all the callous and vitiated Lint, Compress, and Bandage, and compleating the rest of the Cure according to our Directions before given for compleat Fistulæ. See Le Dran, *Obs.* 82.

Another Method of proceeding.

XIV. But if none of the forementioned Signs appear, to direct the Surgeon to the affected Part to be incised; in that Case the Finger may be passed into the Rectum, either with or without the *Speculum Ani*, (*Tab.* XXXIV. *Fig.* 15.) in order to examine the State of the Fistula internally: which is to be done by passing up a large and flexible Silver Probe bent, (as in *Tab.* XXXV. *Fig.* 14.) by the Side of the Finger in *Ano*, that the crooked Part of it may be by the same Finger directed and insinuated into the Fistula, *Fig.* 1. G. In performing which the *Speculum Ani* may frequently be serviceable. The Probe thus entered, is then to be discreetly thrust forward in the Fistula, till its Head makes a Point or Protuberance externally near the Anus F, sufficiently obvious both to the Sight and Touch. Then the Surgeon is to cut down upon the Head of the same Probe with a Scalpel, till the Knife and that Instrument meet each other: after which the Head of the inflected Probe or Silver-wire is to be drawn a little way out through the external Wound, and further bent or brought together with its other End, so as to intercept the Parts to be divided, as represented by DD. To save Trouble, the Surgeon may in short pass the Probe-end of a *Syringotomus* in this Manner, instead of the Silver-wire, so as both to intercept and cut the Parts at the same Time.

What is to be done after the O-

XV. But whatever be the Method taken to lay open and cleanse Sinuses of the Fistula, the Remainder of the Treatment ought to be conducted in the following Manner. First, the external Wound is to be well dilated and cleansed, by filling it with dry Lint and Rags; which, in Case of a profuse Hæmorrhage, ought to be previously dipt in some styptic Powder or Liquor. And in deep Fistulæ, the Dossils of Lint and Rags thus inserted, should be bound with a Thread hanging out, to extract them by; lest if one should be lest behind, it might

perpetually

perpetually keep open the Fiſtula and fruſtrate the Cure. Theſe Dreſſings are to be retained with ſeveral, at leaſt three, thick Compreſſes, each larger than the other, the ſmalleſt to be applied firſt, as we directed for a *Prolapſus Ani:* and the Compreſſes again are to be ſuſtained by the T Bandage, made either of Linen-cloth, Callico, or Fuſtian, neatly and firmly applied. Then the Patient may be put to Bed, and, in Caſe of Fulneſs, when little Blood has been loſt in the Operation, a Vein may be opened, to prevent a ſupervening Inflammation. The firſt Dreſſings ſhould not be removed before the ſecond or third Day after the Operation, without the Patient has a Call to go to ſtool; and even then the Dreſſing ought not to be haſtily undone, without great Urgency, ſince the Patient in this Diſorder has frequently a Teneſmus, or Inclination without any real Call. But in great Urgency, the Bandage muſt by all Means be looſed, both to cool the Patient and keep the Dreſſings clean. If ſome Parts of the Fæces are, at any Time, forced into the Fiſtula in their Diſcharge, Care ſhould be taken to waſh them out with a Spunge and warm Wine, or together with dry Lint; with which laſt the external Orifice of the Fiſtula ſhould be all along dilated and kept open, that it may not cloſe, before the Bottom and other Parts are deterged and incarned. When any callous, or foul Parts appear in the ſucceeding Dreſſings, they ſhould be immediately treated with the Application of dry Lint, ſpread with ſome digeſtive Ointment mixed with red Precipitate; which ſhould be repeated till they are removed, and the Fleſh looks ſound and red, eſpecially towards the Bottom of the Fiſtula, which ought always to be firſt and principally cleared. But, above all, a ſtrict Regard ſhould be had for the firſt Fortnight, not to leave the leaſt Receſs or Sinus behind, which might fruſtrate the Cure, or occaſion the Diſorder to break out again. The Diſcovery of Sinuſes thus neglected, may be made partly by the Probe, and partly by the Quantity, with the Colour and Odour of the diſcharged Matter; which, when ſmall in Quantity, and of a laudable even Conſiſtence, is a Sign of Incarnation, which may be then promoted by the Application of mild Balſams and dry Lint. The Patient's Diet ſhould, in the mean Time, be ſpare and temperate during the whole Cure, as well as for ſome Time after: nor ought he in Strictneſs to be permitted the Uſe of any thing but Milk, Broth, Jellies, *&c.* that yield little or no Fæces, which would greatly retard the Cure, by repeated fouling of the Parts, and ſtraining on the ſtool, and alſo occaſion more than neceſſary Trouble, in often removing and renewing the Dreſſings.

Treatment of complicated Fiſtulæ.

XVI. Fiſtulæ of the Anus complicated with an Ulceration of the Bladder or Urethra, are of all the moſt dangerous, and difficult to Cure, uſually proving inflexible to all Means. When a Fiſtula or Ulcer is alſo attended with a Caries of the *Os iſchium*, or *Os coccigis*; in that Caſe a free Opening or Communication muſt be made betwixt the Part affected and the Ulcer, that proper Remedies may be applied to remove the Caries; ſuch as *Eſſent. Ariſtolochiæ rotund.* which I have found excellent, with proper Mercurials, and a Decoction of the Woods given internally to depurate the Blood from ſcorbutic or venereal Infection. When the Bone is once cleanſed by this Means, and its Surface covered with new Fleſh, the Remainder may be performed as in ſimple Ulcers. Thoſe Fiſtulæ, which are accompanied with an Ulcer of the Bladder, or Urethra, hardly ever admit of a Cure; except the Patient be of a good, healthy, and ſtrong Habit, and the Diſorder recent and ſuperficial: and then the Uſe of proper

proper Internals, with external Detergents and Balſamics, may ſometimes have their deſired Effects.

XVII. I ſuppoſe my Readers are no leſs acquainted than myſelf, that there have been ſeveral other Methods propoſed by the Ancients [a], for treating Fiſtulæ of the Anus, *viz.* by the Uſe of Ligatures, with the Application of actual and potential Cauteries; which I here deſignedly omit, as being leſs ſucceſsful, and much more troubleſome, both to the Patient and Surgeon, than the other Methods of Treatment here delivered. But I muſt not forget to mention, that thoſe who have had their *Sphincter Ani* greatly corroded, or even only weakened by one of theſe Fiſtulæ, are very often troubled for the future with a perpetual Teneſmus, or Incontinency of their Fæces; when, on the contrary, the ſame Sphincter-muſcle may be divided or cut through ſeveral Times, and healed again, without leaving any ſuch Symptom, when the Patient is robuſt, and ſuffers no Loſs of Subſtance in the Part. Sometimes the Operation of cutting is rendered impracticable in this Diſorder, either through the great Age and Weakneſs of the Patient, or the great Depth and Inacceſſibility of the Fiſtula itſelf: in which Caſes we muſt attempt to palliate the Diſorder, by mitigating its Pain and other Symptoms, with Injections, and the Application of mild Balſams. But notwithſtanding the miſerable Condition of many Patients thus afflicted, we are told by Dionis [b], the *French* were ſo fond and proud of being in the Faſhion, when their King *Lewis* XIV. had a Fiſtula, that they boaſted of the Diſorder as a Point of Honour, and would even undergo the Operation, when there was no real Neceſſity. Obſervations on Fiſtulæ.

XVIII. As the Treatment of this Diſorder makes a very difficult and important Branch of Surgery, we ſhall cloſe the preſent Chapter with adding a few Cautions for the better Management of the ſame. 1. In cutting deep and callous Fiſtulæ, the external Inciſion ſhould be much larger than the Internal, that there may be a free Acceſs to cleanſe and dreſs to the Bottom of its Sinus. And it may, in many Caſes, be adviſeable to make two Inciſions in a croſs Manner, and then to extirpate the callous Parts at the Bottom and Sides of the Fiſtula by the Scalpel, or Sciſſars, the vitiated Part being held up by a Hook or Pair of Pliers: for if the Fiſtula be not thus cleared, eſpecially at its Fundus, the Cure thereof will not ſucceed, or at leaſt it will be likely to break out again. 2. In order to avoid injuring the Rectum or Bladder in cutting, it will be beſt to turn the Edge of the Knife from the Inteſtine, and to cut outwards towards the *Os Iſchium*. 3. When the external Opening of the Fiſtula is not near the Anus, but towards the Middle of the Nates, its Sinus proceeding under the Skin towards the Rectum, the Sinus ſhould then be laid open by a Director and Inciſion-knife, or a pair of Probe Sciſſars; dreſſing the firſt Time with dry Lint, and leaving the further Examination of its Nature and Progreſs to the next Dreſſing. 4. When the Sinus appears to have perforated the Rectum, as in a compleat Fiſtula, the Operation of cutting ſhould then be performed by paſſing the Probe-end of the *Syringotomus*, not through the Aperture, but to perforate the Inteſtine therewith, near a Quarter of an Inch above it: by which means, Rules and Cautions.

[a] Hippocrates Lib. *de Fiſtulis*; Celsus Lib. VII. Cap. iv. § 4. Æginета. Albucasis Part II. Cap 80. where he mentions no other Remedy but the actual Cautery.

[b] In his Chapter on the *Fiſtula*.

its

its callous Parts may be more eaſily removed, or cut off; which they ſhould be for about a Straw's Breadth all round, after the Rectum and its Sphincter are inciſed. 5. If a profuſe Hæmorrhage ſhould follow from the Diviſion of a large Blood-veſſel, it ſhould be taken up, if poſſible, with a crooked Needle and Thread. Or, when that is impracticable, you may preſs down a Pledget, dipped in ſome Styptic, upon the Veſſel with your Finger for a conſiderable Time, near half an Hour or longer, till an Eſchar or Cruſt occlude the Orifice; obſerving in your Dreſſing to fill the Cavity well with Lint and Doſſils, retained by thick Compreſſes, and a pretty tight Bandage. Beſides which it may in ſome Caſes be proper to order an Aſſiſtant to compreſs the Parts for ſeveral Hours with his Hand, the Patient being without the leaſt Motion; without which Precaution the divided Veſſels have ſometimes bled ſo profuſely into the Cavity of the Inteſtines, without any eſcaping by the Anus, as even to kill the Patient [a]. 6. When the Patient has not made water for ſeveral Hours after the Dreſſing, he ſhould be reminded thereof, leſt, by retaining his Urine too long, he might have a Suppreſſion, or a freſh Hæmorrhage from the violent Straining. 7. If a fiſtulous Patient has alſo the venereal Diſeaſe, the Cure of the laſt ſhould be accompliſhed before the other be undertaken, which will then frequently heal without cutting. 8. The particular Bandage for this Diſorder, contrived by M. Arneau, and recommended by Garengeot, we ſhall deſcribe at large in the third Part of our Syſtem following, upon Bandages. 9. And, laſtly, when the Wound, made by the Operation, begins to heal up, Garengeot adviſes a Tent of Scraped Lint, like a Finger, to be ſpread with *Ung. Pompholig.* and to be thruſt into the Anus or Inteſtine, to forward the Cicatrization: but dry Lint alone will generally anſwer the ſame Intention with equal Advantage, and leſs Trouble. Uſeful Obſervations on this Diſorder may be read in Le Dran, *Obſ.* 82, 83, and 86.

CHAP. CLXIX.

Concerning Abſceſſes *of the* Anus.

Deſign of this Chapter.

I. THOUGH we have ſlightly touched upon theſe Abſceſſes in the preceding Chapter; yet, as they generally prove the antecedent Cauſes of Fiſtulæ, and as a Knowledge of their Nature and Treatment will reflect ſome Light for the preventing and curing thoſe Diſorders, we ſhall here give them a ſeparate Conſideration.

Nature and Kinds of the Diſorder.

II. The Formation of an Abſceſs in this Part is ſometimes very ſudden, and proves critical; at other Times it increaſes very ſlowly, and almoſt inſenſibly, reſembling at firſt no more than a little Boil, which proves at length extremely painful and troubleſome to the Patient by its malignant Symptoms. The firſt Appearance of the Diſorder is often by a hard conical Protuberance, about the Size of a Filbert, beſet with a red Circle or Inflammation of the adjacent Integuments, the external Skin frequently reſembling an Eryſipelas. When the

[a] See Palfyn *Operat. Chirurg.* Cap. xx.

Parts are thus inflamed without any hard Tubercle, an Abſceſs will be ſometimes formed in the Space of four and twenty Hours. The Pain and Inflammation is ſometimes ſo great as to occaſion a Fever, with Thirſt, Reachings, Reſtleſſneſs, *&c.* As for the other kind of Abſceſs, which advances ſlowly, without any great Inflammation; though its Suppuration be alſo equally ſlow, yet it generally gives Pain enough to alarm the Patient long before it comes to a Head.

Progreſs of the Abſceſs.

III. But whatever be the Manner of its firſt Formation, the Matter of the Abſceſs, when ſuppurated, always makes itſelf a way, by eroding the abjacent *Membrana adipoſa*, till it has either perforated the Inteſtine inwardly, or the Skin externally: And, in its Progreſs, it uſually makes various Sinuſes in the cellular Membrane, converting its included Adeps into a rancid and acrimonious Matter or Sanies: and that ſooner or later, according to the Acrimony of the collected Matter; which eroding through the Inteſtine, external Skin, or both, we need not wonder that Fiſtula ſhould thence ariſe, ſome indeed ſlight and ſuperficial, but others of worſe Conſequence.

Examination of the Abſceſs.

IV. At the firſt Appearance of the Diſorder, it may be treated with diſcutient Fomentations and Cataplaſms, with Bleeding, in order to diſperſe the Tumor before it ſuppurates. But when it is advanced too far, the only Benefit that can then be had, muſt be expected from the Knife, or an Apertion of the Tumor by Inciſion; in order to which its Suppuration ſhould be promoted as in other Abſceſſes. When the Tumor has loſt its Hardneſs and Pain, appearing ſoft, and yielding to the Touch, in order to open it, the Patient is to be placed in the ſame Poſture, as for the Operation of the Fiſtula *in Ano*, at Sect. VI. of the preceding Chapter. After this the Finger is to be introduced into the Rectum, to know whether the Matter tends inwardly, when it does not point outwardly. But before the Surgeon makes his Inciſion, proper Care is to be always taken to bring the Matter of the Abſceſs to a due Degree of Maturation.

Maturation of the Abſceſs.

V. The Maturation of theſe Abſceſſes may be greatly promoted by the repeated Application of a warm Bread and Milk Poultice, with a little Saffron, and a Plaſter of *Diach. cum gumm.* but ſuch Applications ſhould never be ſpread farther than the Part affected, nor be continued beyond their due Time; as that may ſpread the Diſorder, and make it penetrate to more important Parts. The Surgeon ought not therefore to wait till the Matter of the Abſceſs points externally; but after the Cataplaſm has been uſed a few Hours, having cleanſed the Skin, he ſhould ſearch out the thinneſt Part of the Integuments, by preſſing with his Fingers of one Hand in the Anus, and with his others externally, that by the pointing of the Matter, he may be directed where to make his Inciſion. For, to wait any conſiderable Time, under a Notion of the Matter's coming to a Suppuration, as ſome imprudently adviſe, would be to ſpread the Diſorder, and infect the adjacent ſound Parts.

Apertion of the Abſceſs.

VI. The thinneſt and moſt prominent Part of the Abſceſs being marked, and preſſed outward by the Finger *in Ano*, is then to be perforated in the Middle, either with an Inciſion-knife, or Abſceſs-lancet, till the Matter flows out at the Apertion, which is to be further enlarged at Diſcretion, by elevating the Knife or Lancet in their Extraction; a proper Veſſel being alſo placed under the

Wound to receive the Blood and Matter, which are to be gently forced out by compreſſing the circumjacent Parts with the Hands.

Enlargement of the Inciſion.

VII. The Matter being thus, either wholly or in Part, diſcharged, the Apertion may then be more conveniently enlarged, by making a longitudinal Inciſion in the protuberant Lips: and, after examining the Nature and Progreſs of the Sinus with the Finger, another Inciſion may be made, traverſing the former in Form of a Croſs, or in any other Direction that may appear more convenient; always making the external Opening ſufficiently large, for the Conveniency of Dreſſing down to the Bottom, and for the Removal of the vitiated Parts.

Dreſſing.

VIII. For the Dreſſing of the Abſceſs, GARENGEOT adviſes to fill the Sinus with three or four Tents or Doſſils of Linen, each having a Thread annexed, of a different Colour, hanging out of the Wound; that by this means no Miſtake may be made, by drawing out the lowermoſt Doſſil before the others, which might occaſion an Hæmorrhage, or other bad Symptoms. Theſe Doſſils or Tents, he ſays, are to be again covered with ſeveral other Bundles of Linen; and thoſe, again, with ſeveral narrow Compreſſes, each a little larger than the other, as they approach nearer the Bandage. But, I muſt confeſs, I can ſee no Reaſon for thus loading the Part, in the Dreſſing of a common or ſimple Abſceſs. For my own Part, I fill the Sinus with Doſſils of Lint, and compleat the Dreſſing with Compreſs and Bandage, as in other Abſceſſes. Nor do I force away the Lint in the ſubſequent Dreſſings, but treating the Sinus with ſome digeſtive Ointment, and a *Diachylon* Plaſter, I wait for the ſpontaneous Separation thereof by a Suppuration of the Surface; by which means I certainly avoid any profuſe Hæmorrhage. And, laſtly, I deterge the Abſceſs like as in Fiſtulæ of the Anus, and then heal with ſome vulnerary Balſam.

Treatment in Caſe of an Hæmorrhage.

IX. If any conſiderable Blood-veſſel be divided, if it cannot be ſecured by tying with a crooked Needle and Thread, a Compreſs dipt in ſome ſtyptic Liquor ſhould in that Caſe be applied and preſſed on the Veſſel with the Finger, till the Hæmorrhage ceaſes or abates: then the Part ſhould be well filled with Doſſils of Lint, retained with ſeveral thick Compreſſes, ordering an Attendant to preſs his Fingers upon the Part of the Dreſſing oppoſed to the divided Veſſel, as we directed in Sect. XVIII. of the preceding Chapter. As for the Mundification, Incarnation, and Cicatrization, and compleating the Cure, the ſame Methods may be taken as for other Abſceſſes in general. But when the Abſceſs is formed in this Part from a venereal Cauſe, they generally become either fungous or callous, and ſeldom yield to a Cure without the Aſſiſtance of Mercury. See LE DRAN's *Obſ.* 84 and 85.

M. GARENGEOT's Diſtinction.

X. We ſhall conclude this Chapter with obſerving, that GARENGEOT diſtinguiſhes Abſceſſes, like Fiſtulæ of the Anus, into compleat and incompleat. Notwithſtanding this Diviſion, when he comes to treat of their Cure, he has not a Word upon the latter kind, though in reality they deſerved a more particular Conſideration than the other, as may be inferred from what has been ſaid on this Diſtinction of Fiſtulæ in the preceding Chapter, whither I refer the Reader for what more might be here ſaid on that Subject.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

Fig. 10.

Fig. 11.

Fig. 12.

Fig. 13.

Fig. 14.

J. Mynde sc.

An EXPLANATION *of the* THIRTY-FIFTH PLATE. *Relating to* Fiſtulæ *of the* Anus.

Fig. 1. Repreſents the Fiſtulæ in the Anus. AA denote Part of the *Inteſtinum rectum:* B the *Sphincter Ani:* CC a perfect or complete Fiſtula of the Anus, terminating with one Aperture externally, and the other in the Inteſtine: DD a flexible Probe or Silver-wire, paſſed through the two Orifices of the Fiſtula, and bent ſo as to come thro' the Anus E; the two Sides of the Wire intercepting the fleſhy Parts to be divided, are drawn gently outward, for the more ſafe and convenient Performance of the Inciſion. F repreſents an imperfect or incomplete Fiſtula, having only the Orifice G opening into the Inteſtine: HH denote the two Extremities or Heads of the Silver-wire.

Fig. 2. Repreſents an Inſtrument like a large Needle, from GARENGEOT, made of flexible Silver, having an Eye marked A for the Tranſmiſſion of a Ligature, when any one would by that means divide the Parts, according to the Advice of the Ancients; and it may alſo ſerve to convey a Slip of Linen through a Wound or Ulcer in the Manner of a Seton. B the Point of the Inſtrument, which is to perforate the Inteſtine in an incomplete Fiſtula, and then to be inflected and brought out through the Anus; it has a Groove running through its whole Length, by which it may ſerve to guide the Knife inſtead of a Director.

Fig. 3. Is a kind of *Syringotomus* taken in part from GARENGEOT's Treatiſe on Inſtruments (Tom. I. pag. 337.) AAA denotes the Concave and ſharp-edged Part for cutting; BBB its convex Back, which is obtuſe; CD the Silver-wire or Probe-end, which is flexible, and beginning at the letter C, terminates at the point D. The Part marked EE being bent in Form of a Hook, ſerves as a Handle to facilitate the cutting of a Fiſtula, when it is very hard or callous. F denotes where the Inſtrument terminated, as made according to my own Directions, without the Part DF, by which means it more commodiouſly performs its Office, than if it were of the whole Length here repreſented.

Fig. 4, 5, 6, and 7. Repreſent ſeveral common *Syringotomi* of the Ancients, of different Sizes and Curvatures, and furniſhed either with obtuſe or ſharp Points, according to the different Circumſtances of Fiſtulæ: in theſe the Part which cuts is marked AB; C the Probe-end; DD the Convex and obtuſe Back.

Fig. 8. Is a Scalpel or *Syringotomus* firſt publiſhed by BASSIUS. AAA denote the Edge of this Falciform Scalpel; BB the flexible Probe-end, made of Silver; C its Point; DD its Handle.

Fig. 9, 10, 11, 12, and 13. Repreſent the Inſtruments recommended to me for theſe Fiſtulæ, by RUNGIUS, a Surgeon of *Bremen*. *Fig.* 9. AB its grooved Probe or Director; CD the Handle; E the Part where the Director is uſually bent according to the Nature of the Fiſtulæ. *Fig.* 10. gives a direct View

of the Groove in the Director, as the preceding gave an oblique one. *Fig.* 11. AB is a Tube, or large Cannula, to be paſſed into the Anus for the Reception of the Edge of the Knife, *Fig.* 13. in cutting the Fiſtula, that it may not injure the other adjacent Parts: CB its Handle inclined to the oppoſite Side. *Fig.* 12. gives a direct View of the Cavity in this Cannula, that its Diameter may be the better diſcerned. *Fig.* 13. is a long and narrow Scalpel, which, in cutting for a Fiſtula, is conducted through the Groove of the Director *Fig.* 9. into the Cavity of the Cannula *Fig.* 11.

Fig. 14. Exhibits a flexible Silver-probe or Wire, bent in ſuch Manner that the Part A being introduced through the Orifices of the Fiſtula, and brought to its other End, form a Space for intercepting and extending the Parts of the Fiſtula to be inciſed.

PART II. SECT. VI.

Concerning Diſorders incident to the upper and lower Extremities, particularly to the Hands and Feet.

THOUGH we have conſidered moſt of the Diſorders which uſually happen in theſe Parts, as Wounds, Fractures, *&c.* in the former Part of our Surgery; yet we muſt not here omit to treat of a few which are more peculiar to theſe Parts, and which we have not examined; ſuch as the Paronychia, Ganglion, Suture of a Tendon, *&c.*

CHAP. CLXX.

Of the Paronychia, *or* Whitloe.

Nature of the Diſorder.

I. A Paronychia or Whitloe is an inflammatory and exceeding painful Diſorder, which infeſts all the Joints and particularly the Ends of the Fingers, which are generally much ſwelled, with a beating or throbbing, and intenſe Heat. There is ſometimes little or no Tumor obſerved, when the Diſorder lies deep at, or in the Bone: and ſometimes again the Tumor, Pain, and Inflammation are extended from the Finger up to the Elbow, or even to the Shoulder; from the Communication of the Fingers with thoſe Parts by their Flexor Muſcles. Sometimes the Pain is ſlight and inconſiderable; but very often 'tis ſo exceſſive and tormenting, as to make the Patient lament Day and Night without a Wink of Sleep: and, in ſome Conſtitutions, it even excites a raging Fever, with Faintings, Convulſions, Delirium, an Abſceſs, or Sphacelus of the Part, and, without timely Aſſiſtance, Death itſelf.

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II. As the Symptoms of this Diſorder vary in their Appearance and Malignity, according to the different Parts thereby affected, it has been therefore diſtinguiſhed by Surgeons into various Kinds. GARENGEOT reckons four, and GOUEUS five: but, for my own Part, I cannot find any Ground for diſtinguiſhing more than three Species of the Paronychia. The firſt Kind is when only the Integuments are affected at the End of the Finger, either in its Back or Fore Part, or near the Nail; in which Caſe the Symptoms are uſually not very malignant, though the Pain be extremely acute. The ſecond Kind of Paronychia is, when the Perioſteum is inflamed or eroded, in which Caſe the Symptoms are more or leſs violent than in the preceding, in Proportion as that very ſenſible Membrane is more or leſs violently affected. The third and worſt Kind of this Diſorder is that infeſting the nervous Involucra, or Coverings of the Tendons belonging to the Flexor Muſcles of the Fingers, or even the adjacent Nerves, or Tendons themſelves: for, in that Caſe, the Diſorder often appears with the moſt excruciating Pains, and the black Train of its moſt malignant Symptoms. Kinds.

III. The true and proximate Cauſe of a Paronychia ought, in my Opinion, to be referred to an Inflammation of the adjacent Integuments, chiefly of the Perioſteum, from an Inſpiſſation of the Blood, or an Obſtruction of its ſmall Veſſels; which is alſo argued from the intenſe Heat and Pulſation of the affected Part. This Inflammation may again proceed from internal or external Cauſes acting ſeparately or combined: as, internally, an Inſpiſſation, or Acrimony of the Blood and Lymph, induced by a tenſe Fibre, and a heating Regimen, or an Abuſe of the Nonnaturals; externally, a Contuſion, Wound, or Puncture, or with the Stimulus of a foreign Body, as a Needle, Thorn, Splinter, *&c.* continuing to exaggerate the Part. Therefore a Paronychia is more dangerous and ſevere, in Proportion to the Intenſity of the Inflammation, and Senſibility of the affected Parts. We are not ignorant, that ſome Phyſicians have attributed the Cauſe of this Diſorder to Worms, which appeared to the Eye upon making an Inciſion in the Part: but this is not often the Caſe, notwithſtanding the *Germans* frequently call this Diſorder by the Name of *Worms in the Fingers*. Cauſes.

IV. In the Beginning of the firſt Species of Whitloes, there appears a ſmall Tumor and Hardneſs in the affected Part of the Finger, but without any great Pain; which, at length increaſes, and the Part begins to look red and inflamed. But though the Diſorder thus gradually advances in this Species, and the Tumor is much increaſed; yet the Pain is generally pretty tolerable, and not extended beyond the Finger, as it is in the other Kinds of Whitloes. And here the corrupt Matter is generally apparent. But the nearer the Inflammation approaches the Perioſteum and Tendons of the Fingers, the more intenſe is the Pain, which is ſometimes ſpread through the whole Arm. Signs of the firſt Kind.

V. The ſecond Species of Paronychia is diſtinguiſhable from the former, in that the Pain is very intenſe, though confined to the Extent of the whole Finger, or barely its End; being ſometimes ſo ſevere as to excite a Fever, Reſtleſſneſs, Convulſions, Delirium, *&c.* without the Appearance of any great Tumor or Inflammation; nor does the Pain here extend itſelf up to the Elbow, as it does in the third Species of this Diſorder. Signs of the ſecond Kind.

VI. The

Signs of the third Species.

VI. The third Species of the Diſorder may be diſcerned by there being little or no Tumor at the End of the Finger, eſpecially when the Capſula of the Tendon is inflamed more in its internal than external Part. Here the Pain is ſo intenſe, that the Patient knows not what to do with himſelf: and, inſtead of the Diſorder being confined to the Finger, it ſpreads through the whole Hand and Arm; and particularly that Part of the Carpus which is inveſted with a tranſverſe and annular Ligament, continued even to the Internal Condyle of the *Os humeri*, from whence the flexor Muſcles of the Fingers ariſe, though the Pain is even ſometimes extended to the Shoulder, with Fever, Convulſions, *&c.* If any corrupt Matter be lodged in the Capſula of the Tendon, it does not form any Appearance of Tumor at any Part of the Fingers, their Joints being in other Parts too denſe and compact. The Hand is uſually ſwelled more than the Finger, though with leſs Pain: and the Arm is ſometimes enlarged to ſuch a Degree by it, that GARENGEOT has obſerved it as big as one's Thigh.

Event of the Diſorder.

VII. The Paronychia terminates variouſly according to its different Nature and Symptoms. That of the firſt Kind is not very dangerous. But when the Parts affected are near about, or at the Root of the Nail, the latter generally ſeparates from the Finger, and with a good deal of Pain to the Patient; though ſometimes only that half of the Nail ſeparates, which is neareſt to the Whitloe. When the Matter is lodged either under the Nail, or immediately next to the Tendon of the Finger, it then uſually gives the Patient intolerable Pain and Uneaſineſs. Thoſe afflicted with the ſecond Species of this Diſorder are in a worſe Condition than the former, as the Pain and other Symptoms are here more violent, ſo as ſometimes to put the Patient in Danger of his Life; tho' it very ſeldom arrives to that Degree of Violence, as far as I have been capable of obſerving. Sometimes I have found a Caries take place in the Bones of the Finger, as a Conſequence of the preceding Inflammation and Suppuration; and when this is the Caſe in the laſt Bone of any of the Fingers, which is a very ſmall one, it ſcarce ever exfoliates, but the corrupted Part generally deſtroys the whole. As for the third Species of the Paronychia, in that the Patient's Caſe is the worſt of all, being really dangerous. For here the intenſe Pains, Abſceſs, Grangrene, Tumor, and Inflammation of the whole Arm, together with a Fever, and other malignant Symptoms, frequently deſtroy the Patient; unleſs prevented by a good Conſtitution, and a timely Aſſiſtance from Art. If in this Diſorder an Abſceſs ſhould be formed under the annular Ligament of the Carpus, near or upon the *Pronator quadratus* Muſcle of the Radius, GARENGEOT[a] then thinks it the Surgeon's Buſineſs to declare the Caſe incurable without Inciſion. And even then the Patient may be in Danger of loſing the Uſe of his diſordered Finger, notwithſtanding the moſt prudent Treatment; and then the inevitable Conſequences of the Diſorder, or Patient's Neglect and ill Habit of Body are often, by the malevolent, unjuſtly attributed to a want of Care or Judgment in the Operator.

Treatment by Medicines.

VIII. For the Cure of a Paronychia GARENGEOT propoſes Inciſion before any Tryal has been made with other Remedies. But my Opinion is agreeable to the Advice of HIPPOCRATES (§ VII. *Aph.* 6.) that the more gentle Means

[a] As GARENGEOT obſerves in his Chapter on the *Paronychia*; but with us the Caſe is ſeldom bad.

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and Medicines are to be firſt uſed, before we have Recourſe to the more ſevere and dreaded Help of the Knife: and the more ſo, as Experience demonſtrates, that many of theſe Diſorders (being ſlight or recent, and under good Circumſtances) are frequently diſperſed and removed, by the uſe of diluent, diſcutient, and cooling Remedies, without an Inciſion in the diſeaſed Parts, of which the Patient muſt be greatly afraid. The moſt approved Method for removing the Inflammation and Obſtruction in this Manner, is to let the Patient hold his Finger for ſeveral Hours in *Sp. Vini* highly rectified, or camphorated with *Theriaca*. For the ſame Intention may be uſed, with Succeſs, a Decoction *ex allio & fol. Scord. Sabin. Manipulo in Lacte parat.* in which hot Liquor the Finger ſhould be either immerged for ſeveral Hours together, or elſe frequently fomented with it by Linen-rags. The *Pariſian* Academiſts (*Acta Ann.* 1707. p. 57.) recommend for this Purpoſe, frequently to dip and hold the diſordered Finger a little while in ſcalding Water. Some applaud the Uſe of an *Aſſa fœtida* Plaſter, applied warm: others recommend, as from Experience, the Application of the white Skin of a boiled Egg-ſhell. To which we may add, that Riverius directs a frequent Intruſion of the diſeaſed Finger into a Cat's Ear, with Bleeding, and the Uſe of cooling Medicines. If the Patient finds Relief by any of thoſe Means, he ſhould perſiſt in the Uſe of them till the Finger is well, and without Pain. But when there is already a Suppuration actually formed, either before or under the Uſe of theſe Means, then indeed an Inciſion is the only Remedy. When the Patient is afraid to admit the lancing of his Finger, or when there is no Appearance of Matter formed, to direct the Inciſion, in the firſt Kind of the Diſorder; a Suppuration may be then promoted by the Application of a Diachylon-plaſter with the Gums. But in the ſecond or third Species of the Paronychia, where the Perioſteum or Bone are affected; this Practice would be highly pernicious, as it muſt greatly increaſe the Pain and Diſorder, and induce an Abſceſs, Caries, a Gangrene of the whole Arm, and probably the Death of the Patient.

Operation for the firſt Species.

IX. In order to ſucceed in the Cure of a Paronychia, its particular Species is to be firſt accurately diſtinguiſhed. If it be of the firſt Kind, and but ſuperficial in its Extent, its Cure may then be eaſily effected. As ſoon as the Surgeon perceives the Matter to point or form a little Protuberance, he ought immediately to hold and preſs it betwixt the Finger and Thumb of his left Hand, while he makes a longitudinal Inciſion therein with his right; by which means the Matter being diſcharged, the Finger will then heal almoſt of itſelf. Hildanus (*Cent.* I. *Obſ.* 97.) propoſes the following, as a very ſafe and ready Method of curing this Diſorder, which he has made Trial of with Succeſs. Firſt, he fomented the Finger for ſome Time in a Decoction *ex Flor. Chamam. Melilot. ſem. fœnugrec. & cydonior.* in Milk. Then gently cutting off the Surface of the Skin where the Pain lay, he found ſome red Specks. Theſe, being inciſed, afforded a Drop or two of a red Water; which, when he had wiped off, and dreſſed the Wound with Lint moiſtened in an Infuſion of *Theriaca* in *Sp. Vini*, the Pain quite vaniſhed, and the next Day the Finger was well without any other Remedy.

Treatment of a Paronychia near the Nail.

X. When the Diſorder happens either underneath, at the Bottom, or on either Side of the Nail, the Patient then generally loſes the whole, or ſome Part of

of it. If a purulent Matter lies concealed under the Nail, it uſually excites violent Pain and Inflammation, by eroding the adjacent Parts. It ought therefore, according to the Advice of SOLINGEN, and other expert Surgeons, to be diſcharged with all poſſible Expedition, either by cutting off the Nail, or by making an Inciſion into it; and, after preſſing out the Matter, the Wound may be dreſſed and healed with Lint dipped in *Sp. Vini*, or *Aq. Calcis*.

When the Matter runs deep.

XI. When the Matter ſpreads further or deeper under the Skin, the Intention is ſtill the ſame, to diſcharge it by Inciſion without Delay, leſt it affect the ſubjacent Bone before it erodes a Paſſage through the Integuments, which are in this Part more hard and impenetrable to it than in others. If the Patient be unwilling to have the Part inciſed, the Neceſſity thereof ſhould be laid open to him, by declaring the Conſequences, in order to bring him to a Compliance, and to clear the Operator from the Charge of Neglect or Miſconduct: and in the mean Time, the Finger may be dreſſed with a Plaſter of Diachylon with the Gums, to promote the Suppuration. If the Skin ſhould break with the ſimple Application of the Plaſter, as is ſometimes the Caſe, the Opening may be in ſome Meaſure inlarged; and when the Matter is diſcharged, and the Parts cleanſed, let the Dreſſing be with ſome digeſtive Ointment, or *Linimentum Arcæi*, made warm, and mixed with a little Spirit of Wine, with a Piece of the forementioned Plaſter and a Bandage. But if the Patient ſubmits to the Operation, his Finger is to be placed on a Table, with the affected Part upwards, in which Poſture it is to be held firm, together with the whole Arm by a robuſt Aſſiſtant, leſt the Patient ſhould flinch in the Operation, to the Detriment both of himſelf and the Surgeon. The Inciſion is then made with a ſtrong and ſharp-pointed Scalpel through the Integuments down to the Bone, even to the End of the Finger; by which Means the ſtagnant Blood and Matter being ſet at Liberty, the Bone is in no Danger of being thereby infected.

Treatment of the ſecond Kind.

XII. In the ſecond Species of the Paronychia, when the Matter is contained between the Perioſteum and Bone, an Inciſion is then alſo to be made for its Diſcharge, according to the preceding Directions; only here more Care is to be taken, that the Knife penetrate to the Bone. If the Pain abates ſoon after the Operation, 'tis a good Sign of a ſpeedy Cure, notwithſtanding there might be little or no Quantity of Matter diſcharged; which is ſo ſmall as to be hardly perceptible in many Caſes. With regard to making the Wound or Inciſion, it is to be obſerved, that many Surgeons lay it down for a Rule, never to inciſe the fore or back Part of the Finger, but on one Side of it, to avoid injuring the Tendons, which bend and extend the Internodes. But this appears to be a Caution unneceſſary; partly becauſe thoſe Tendons are not continued to the very Ends of the laſt Internodes, and partly becauſe we find by Experience, that the Finger may be ſafely inciſed in this Manner. The lateral Method of Inciſion is however preferred, and ordered to be ſtrictly obſerved by GARENGEOT, but without the Addition of any Reaſon for it. He likewiſe adds, that if the Pain does not abate ſoon after the Inciſion has been made on one Side, 'tis a Sign that the other Side is affected; and therefore another Inciſion is to be there made. But my Advice is always to make your Inciſion on one Side, when the Pain and Tumor is diſcernible in that Part, or when the Diſorder happens in

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the ſecond or third Internode of the Finger towards the Hand: but on the other Hand the Inciſion may be better made in the Middle of the Finger's Ends, when the Matter points there, or when the Diſorder infeſts the whole Joint. Nor is the Infliction of two Inciſions, where one well made may be ſufficient, either conſiſtent with the Inclination of the Patient, or Reputation of the Surgeon.

Treatment after the Operation.

XIII. The Inciſion being made, the Blood ſhould be ſuffered either to flow out a little while of itſelf, or elſe it ſhould be preſſed out, to abate the Inflammation, and diſcharge what may be offenſive. In the next Place, the Wound is to be dreſſed with dry Lint and Diachylon Plaſter, with a Compreſs dipped in warm Spirit of Wine, each of them being cut in Form of a *Malta* Croſs, and retained by the Bandage proper for Diſorders of the Fingers. In dreſſing the Wound again the next Day, there generally appears a little ſpungy or proud Fleſh ſprouting out, which often Alarms an unſkilful Surgeon without any Reaſon; for this is no bad Sign, and may be eaſily removed, either with the Sciſſars, or ſome Eſcharotic mixed with digeſtive Ointment. The Wound is next to be treated like thoſe in which the Bones are affected, *viz.* with *Eſſent. Myrrh. Succin. Balſ. Peruv.* &c. And if the Bone is foul, the Wound ſhould be kept open with Lint dipped in *Tinct. Myrrhæ*, till there is an Exfoliation made of the morbid from the ſound Parts, or elſe till the whole Bone comes away entire, as is often the Caſe; after which the Wound may be deterged and healed without Difficulty, which would be impracticable ſo long as the Bone remains foul.

Treatment of the third Kind.

XIV. We ſhall now proceed to the Treatment of the third and laſt Species of the Paronychia, in which the Pain and Inflammation, or the malignant Matter is ſeated in the membranous Capſulæ, or Coverings, which inveſt the Tendons of the Flexor Muſcles of the Fingers. This is a Caſe that has not often occurred to my own Obſervation, and was firſt propoſed by GARENGEOT, whoſe Advice is to treat it in the following Manner. Firſt, the ſmall Tumor (which is diſcernible at the End of the Finger, partly by the pointing of concealed Matter in the Capſula, and partly by the Pain felt by the Patient) is to be opened, by making an Inciſion longitudinally down in the Capſula of the Tendon, which will diſcharge a Kind of Lymph or Serum to the great Eaſe of the Patient: but notwithſtanding the Pain will return again in a little Time. Sometimes the Matter makes its own Way without any Inciſion through the Skin and Capſula of the Tendon; and about its external Opening appears a very ſenſible Caruncle, or fleſhy Subſtance, which is conſtantly moiſtened with the diſcharged Humour. In this laſt Caſe he adviſes to paſs a Director through the external Opening into the eroded Capſula of the Tendon; and then to make an Inciſion through the Parts incumbent on the Director, by which Means a thicker Matter will be found concealed in the divided Sinus. If the internal Sinus of the Paronychia is in the middle Part, or ſecond Joint of the Finger, and is laid open ſo far by Inciſion, in that Caſe PETIT adviſes to continue the Inciſion, even down for above a quarter of an Inch into the Hand, in order to free the Tendon from the Stricture received from the Tenſion of the Parts at the End of the Finger, where the Capſula is hard and cartilaginous: for in the Hand, where it is ſoft and membranous, it will yield to the confined Humours without preſſing the Tendon.

Treatment of a Paronychia, which penetrates into the Hand.

XV. When the Diſorder or Matter has reached the membranous Part of this Capſula of the Tendons, which expands itſelf from under the annular and tranſverſe Ligaments of the Carpus up to the Cubitus, and when the ſaid Matter begins to convert the Adeps upon the *Pronator quadratus* Muſcle of the Radius into *Pus* or *Sanies*; in that Caſe the Director is to be gradually inſinuated, and the Parts inciſed upon it down to the annular Ligament. Which done, the Patient's Hand is to be bent to relax the Parts, and then the Director conveyed under the ſaid Ligament, making an Inciſion or Aperture, by cutting down into the Groove of the Director on the other ſide of the Ligament, which itſelf ſhould be left entire. The Aperture thus made, and ſufficiently enlarged, the Matter will be more eaſily diſcharged, and you may have a better View of the Sinus or Abſceſs; in order to which you ought alſo to make a gentle and gradual Separation of the Tendons as much as poſſible from each other at the Carpus. In the next Place M. GARENGEOT informs us, that it is the good Advice of M. THIBAUT, who was lately a celebrated Surgeon at *Paris*, to paſs a Ligature by a Probe through the two Apertures as in a Seton; by which means the Matter may be cleanly diſcharged, and the Ulcer deterged without dividing the Ligament. But if the Fever, Pain, and other Symptoms, do not abate by this Procedure, M. PETIT adviſes immediately to divide or cut off that Tendon, which is moſt diſordered, cloſe to its muſcular Fleſh above the annular Ligament; by which Method he aſſerts, the Pain has inſtantly abated, and the Patient been happily cured. He alſo thinks that the tranſverſe Ligament of the Carpus ſhould be ſerved in the ſame Manner, when that is inflamed, or eroded by purulent Matter, ſo as to excite moſt acute Pains: the Succeſs of which Practice is confirmed by the Inſtances of M. ARNAUD, formerly an eminent Surgeon of *Paris*. When the Director cannot be well paſſed under the annular Ligament for this Purpoſe, an Inciſion ſhould be made betwixt the Artery on the Radius, and the Tendons of the Profundus and Sublimis Muſcles [a]; by which Inciſion, being ſufficiently enlarged, the confined Matter is to be prudently evacuated, and the State of the Sinus examined. To recommend this Practice to us, GARENGEOT relates the Caſe of a Patient of ARNAUD's, who had this Diſorder in ſuch a deplorable Manner, that ſome Surgeons judged the Arm ought to be amputated, and others, that the Patient could not long ſurvive it: but, upon Mr. ARNAUD's dividing the tranſverſe Ligament, all the Symptoms diſappeared in a ſurpriſing Manner, and the Patient was quickly cured. But it is here a very neceſſary Caution to obſerve, that the Patient's Hand be neither extended during the Operation, nor for ſome Time after. For when the Hand and Carpus are in an inflexed Poſition, the divided Ligament will more readily unite, and the Hand recover its uſual Motion: but if they be imprudently extended, the Tendons under the divided Ligament will ſtart out of their Places, and perhaps not only hinder its uniting, but alſo impede or deform the proper Motions of that Member for the future.

The Dreſſing.

XVI. Having finiſhed your Operation in this Manner, your next Buſineſs is to proceed to the Dreſſings: which are to be made when any of the Capſulæ of

[a] I once opened a large Abſceſs in this Part near the radial Artery; but it had no Communication with the Fingers, nor the Capſulæ of their Tendons.

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the Tendons are opened, firſt, with ſeveral Doſſils of dry Lint, of an oblong Form, and laid on each Side the Tendon, to ſuppreſs the Hæmorrhage by compreſſing the divided Veſſels. But if any very large Blood-veſſel be divided, and bleeds profuſely, it ſhould be taken up with a crooked Needle and Thread: for it is not ſafe here to apply cauſtic and ſtyptic Remedies for this End, as in other Wounds. In the next Place, the Hand and Arm are to be wrapped up to the Elbow in a warm, emollient Cataplaſm, retained by the Bandage of eighteen Heads, *Tab.* 9. *Fig.* 4. B B. The advantage of which Bandage over the long ones, may appear from your being thereby enabled to apply, and renew the Dreſſings at Pleaſure, without moving or diſturbing the Parts. Laſtly, to render the Dreſſing as complete as poſſible, you ought to apply the entire Part of the Bandage to the ſound Part of the Limb oppoſite to the Wound; by which means the Dreſſings will be more firmly and effectually retained upon the affected Parts.

CHAP. CLXXI.

Of Ganglions *or Knots of the* Tendons.

I. A *Ganglion* is, by our modern Surgeons, underſtood to be a hard Tubercle, generally moveable, in the external or internal Part of the Carpus, upon the Tendons or Ligaments in that Part, but uſually without any Pain or great Uneaſineſs to the Patient. The *Germans* term the Diſorder *Oberbein*, i. e. *Hyperoſtoſis*; either becauſe this Kind of Tumor is ſeated on a Bone, or from its reſembling that Body in Hardneſs. Though Ganglions ſo nearly reſemble Tumors incyſted (conſidered in Chap. XXVIII. preceding) that CELSUS, *Lib.* 7. *Cap.* 6. makes them one and the ſame; yet their Difference may appear, if it were only from their different Seats. For Ganglions are confined to the Tendons and Ligaments of the Hands and Feet; but incyſted Tumors are not reſtrained to any Part of the Body. However, it is to be obſerved that ſome, even of the Moderns, call a ſimilar Species of hard and moveable Tubercles in the Head, and eſpecially the Forehead, by the Name of Ganglions; as you may ſee in a profeſſed Diſſertation *de Ganglio*, publiſhed at *Altorf*, *Anno* 1717. Deſcription.

II. With regard to the Cauſes of Ganglions, they ſeem generally to proceed from an Inſpiſſation of the viſcid Juices which are let out, and lodged betwixt the Fibres and Membranes, when the Tendons and Ligaments of theſe Parts have been injured by a Fall, Blow, Strain, Contuſion, Luxation, or the like: in which Caſe they gradually increaſe more or leſs, as long as the Fibres yield, the Juices find Vent, ſo as to advance to the ſize of a Filbert, Nutmeg, Walnut, or even a Pidgeon's Egg. BLANCARD mentions that RUYSCH found a Ganglion in a dead Subject like a pellucid and cryſtalline Humour; ſimilar to which, I ſaw my Son cut out one, the Size of a Nutmeg, from the Back of the Wriſt of a young Woman at *Helmſtadt*, in the Year 1736. To which we may add, that the noted CYPRIANUS [a] has taught us, that they proceed from a Kind of Cauſes.

[a] Lib. *de Fœtu è Tuba Fallopiana exciſo*, pag. 76.

Lymph, like the White of an Egg, which is retained and inſpiſſated in the Capſulæ of the Tendons, without coming to Suppuration; which is alſo conformable to what I have frequently obſerved myſelf.

Kinds. III. If we attend to the Differences or Kind of Ganglions, we ſhall find a very great Variation, as well in their Size, which we before mentioned, as in their Number, Figure and other Circumſtances. Sometimes there is but one, ſometimes ſeveral, and in each Hand; as we have a notable Inſtance in the *Miſcellanea Acad. nat. curioſ. Dec.* I. *Ann.* 3. *Obſ.* 326. Some are oblong, round, or oval, with an equal or unequal Surface. Some of them, which are recent, may be eaſily diſperſed; while others, which have been of long-ſtanding, hardly yield to any Remedies but the Knife.

Cure. IV. The inſpiſſated Matter of a recent Ganglion may often be happily diſperſed, barely by rubbing the Tumor well every Morning with the faſting Saliva, and binding a Plate of Lead upon it afterwards for ſeveral Weeks ſucceſſively. Many attribute a ſtronger diſcutient Virtue to the Lead, when it has firſt had ſome Mercury rubbed upon it: and others, with leſs Reaſon, prefer a Bullet that has killed ſome wild Creature, eſpecially a Stag. Some, with Forestus[a], adviſe the Uſe of *Emplaſt. de Ammoniaco vel de Ranis cum Mercurio*; and often to Rub them well with *Ol. Saponis*, *Philoſophorum*, *vel Petrolium*. Sometimes indeed a recent Ganglion will ſpeedily vaniſh by the Uſe of theſe Diſcutients, eſpecially by adding a repeated Preſſure on them with all one's Might by the Thumb[b]. Meekren writes, that a Cure may be readily performed, if the Patient frequently lays his Hand on a Table, and ſtrikes on the Tumor with his Fiſt; ſee *Tab.* XXXVI. *Fig.* 1. And this ſeems to be the Reaſon why Muys aſſerts, that an inveterate Ganglion, which cannot be diſperſed by Medicines, may yet be diſſipated by frequent beating with a Stick, or a wooden Mallet armed with Lead; and then applying to the affected Part the *Emplaſt. de Ranis cum Mercurio*, to prevent a Return. We alſo read, that Helvetius made uſe of a wooden Hammer for this Purpoſe. And thus they Account for it: The Membrane or Sacculus of the Tubercle being burſt by the Blow, the collected Matter is thereby diſcharged; which is afterward to be diſperſed by frequent Rubbings and digeſtive Medicines. But, in this Operation, Care ſhould be taken not to injure the Bones, Tendons, or other Parts of the Hands, when you ſtrike the Tumor; for that might occaſion the very ſame, or a worſe Diſorder. If none of theſe Means prove effectual, it will be neceſſary to remove the Tubercle, either by Inciſion or Cauſtics, as we have propoſed for incyſted Tumors, in Chap. XXVIII. They may be ſafely removed by Inciſion, provided you are careful to avoid the adjacent Tendons and Ligaments; as may appear from Solingen, in *Part* IV. *Chap.* 14. of his *Surgery:* and I have myſelf ſeveral Times happily removed them this way. But as for rubbing them with the Hand of a dead Man, and the like ſuperſtitious Ceremonies, they are of ſo little Conſequence, and founded on ſo weak a Baſis, that, I preſume, my Reader will readily excuſe me from inſiſting on them.

[a] *Obſ. Chirurg.* Lib. III Cap. ix.
[b] See Ætius *Tetrab.* IV. Serm. III. Cap. ix. and Muysii *Prax. Chirurg.* Dec. II. Obſ. 8.

CHAP.

CHAP. CLXXII.

The Suture of Tendons in the Hands.

I. THE Suture of Tendons in the Hand is, by our modern Surgeons, performed, in order to join them when they have been cut aſunder, that the Fingers, to which theſe Tendons belong, may not grow ſtiff, or loſe their motion. This Operation of joining the divided Tendons by Suture, may be performed without much Difficulty, when they are ſeated ſuperficially, or near the Skin. Such are the Tendons on the Back of the Hand, which ſerve to extend the Thumb and Fingers; as alſo thoſe on the Backs of the Fingers themſelves [a]: to which we may add, the Tendons of the Flexors of the Fingers [b], which run on their Inſides, with thoſe of the Flexors and Extenſors of the Hand near the Carpus. In the Leg we include the Tendons in the Ham [c], with the Tendon of the *Extenſores Tibiæ* below the Knee, and the *Tendo Achillis* [d] above the Heel, *&c* [e]. Whereas the Tendons, in the Palm of the Hand are ſo deeply ſeated, that I cannot find one Inſtance of their being joined by Suture. It is obſervable, that this Practice has lain neglected by almoſt all the Ancients, in Conformity to the Saying of HIPPOCRATES (*Aph.* 19. Sect. IV. and *Aph.* 28. Sect. VII.) "that a Nerve or Tendon, being cut aſunder can never grow or unite again afterwards," which gave them an Averſion to this Operation, inaſmuch as a ſlight Puncture in a Tendon often excites the moſt grievous Symptoms. Yet that there were ſome, in the Time of GALEN, who practiſed this Suture of the Tendons, may be concluded from his adviſing againſt it [f]: which Advice was rigidly adhered to by the Generality, and particularly AMB. PAREY [g]. However, this Operation has been ſufficiently conſidered, and approved of by the *Arabian* Phyſician AVICENNA [h], GUIDO DE CAULIACO [i], SALICETUS [k], ROGERIUS [l], LANFRANCUS [m], BRUNUS [n], CHALMETEUS [o], ANDREAS A CRUCE [p], and others, among the ancient Surgeons.

Deſign of Sutures of the Tendons.

[a] See a *French* Treatiſe, entitled, *L'Art de faire rapport en Chirurgie*, pag. 194, and 195. See alſo VERDUC on *Chirurgical Operations*, Chap. xxxii.

[b] See MEEKREN *Obſ.* Cap. 65.

[c] PAREY, in his *Surgery*, (Book 9. Chap. 36.) relates, that theſe, and other Tendons of the Limbs, have been ſewed together by ſome Surgeons; but that he never durſt undertake it, for fear of exciting Pains, Convulſions, and other bad Symptoms.

[d] VESLINGIUS tells us, (in *Obſ.* & *Epiſt.* XV.) that he ſaw theſe two Tendons joined by Suture.

[e] We have an Account of the Tendons belonging to the Flexors of the Carpus being happily joined by Suture, in WEPFER Lib. *de Cicuta Aquat.* p. m. 92 and 93. And a Suture of the Tendons belonging to the *Supinator longus* and *ſublimis* Muſcles in STALPART VANDER WIEL, Cent. II. Obſ. 45.

[f] Lib. III. *de Comp. Medicament.*

[g] Lib. IX. Cap. xxxvi.

[h] Lib. IV. Fen. 4. Tract. 4. Cap. ii.

[i] Tract. 3. Cap. iv.

[k] Lib. II. Cap. ix.

[l] Lib. III. Cap. xiii.

[m] Lib. II. Cap. ix. Doct. 3. Cap. iii, and in *Chirurg. parv.* Cap. iv.

[n] Lib. I. Cap. v.

[o] *Enchirid Chirurg.* Lib. II. Cap. xi.

[p] Lib. *de Vulner.* T. 2. Lib. II. Cap. viii.

And yet, notwithſtanding this, the Practice has been either unknown, or elſe unreaſonably rejected as dangerous by their Succeſſors till at length VESLINGIUS [a] and SEVERINUS [b] revived it in the laſt Century, after whom it was brought into Practice by FELIX WURTZ [c], who was ſeconded by many other celebrated Surgeons; particularly MAYNART [d] and BIENAIS [e] of *Paris*, with PURMANNUS [f] and others [g]. This Operation ſucceeds beſt when the Wound is recent, or lately inflicted; but may be alſo undertaken with Succeſs on the ſecond, third, or fourth Day after the Accident. Yet the Difficulty is much greater to make a Suture of the Tendon, when it has been ſo long neglected as to let the Wound heal up; but that it is then alſo practicable, may appear from Experience, and the Writings of many able Surgeons [h].

When the Suture is to be undertaken.

II. Before the Operation be undertaken, it will firſt be proper to conſider, whether it may be neceſſary or practicable in the Patient's Caſe. For Tendons are frequently divided in Parts ſo as to be inacceſſible to the Needle, and ſometimes the Suture cannot be performed on them without great Danger; and in ſome other Caſes, it may be practicable, and not neceſſary, as when the Tendons may be brought and retained together by Compreſs and Bandage without Suture. But if a conſiderable Part of the Tendon is cut off, or deſtroyed, or its Parts recede much from each other, and lie concealed betwixt the adjacent Muſcles, ſo that the two Ends cannot be brought together, it will then be in vain to attempt the Operation. Nor can the Suture of a Tendon ſucceed well, if its Ends are violently contuſed, as the conſequent Inflammation, Suppuration, and other malignant Symptoms, will prevent their uniting and healing, and the Symptoms be rather exaggerated by a Suture. In ſuch a Caſe, it is therefore more adviſeable, as GARENGEOT obſerves, to wait till the Inflammation and other Symptoms are removed, and to promote a Separation of the unſound Parts before you venture to uſe the Needle. The ſame Author alſo obſerves, after SOLINGEN, that the Tendons of the Extenſors in the Back of the Hand may generally be united without Suture, by bringing and retaining the divided Ends to each other, the Fingers being all the Time extended out a little backwards, with Bandage and Compreſs. By this Method I have ſeveral times joined divided Tendons without any Suture, and particularly I ſucceeded this Way in a Lad, who had all the Tendons of the Extenſors of his Fingers divided on the Back of his Hand. Therefore the Surgeon need not give himſelf the Trouble, nor

[a] *Obſervat.* and *Epiſt.* XV. where he tells us, that he ſaw this Operation performed, not only with Aſtoniſhment (thinking it a raſh Undertaking) by the *Arabian* or *Turkiſh* Surgeons, but alſo upon a Servant of his Father's in *Germany*.

[b] *De Efficaci. Medic.* Lib. II. Cap. cxxiii.

[c] *De Vulnerib.* Cap. xiv.

[d] See MEEKREN *Obſ.* 65.

[e] VERDUC, VAUGUION, and DIONIS, attribute the Revival of this Operation to BIENAIS; but ſay nothing of MAYNART, who performed it at *Paris* in the Middle of the laſt Century.

[f] This Author aſſerts, in his *Chirurgia Curioſa*, that he has above a dozen Times happily joined divided Tendons by Suture with a crooked Needle; and the ſame he alſo aſſerts in his *Chirurgia Caſtrenſis*, pag. 100.

[g] ETMULLER tells us, he ſaw this Operation performed at *Paris* in 1665, or 1666, without mentioning by whom; and various Inſtances and Obſervations in this Kind of Suture, and other Diſorders of the Tendons, may be ſeen in STALPERT VANDER WIEL, *Obſ.* 45. Cent. II.

[h] This is aſſerted by VERDUC and LE CLERC, in their Treatiſes of *Chirurgical Operations*, Chapter on the *Suture* of a Tendon; but it is denied by DIONIS.

his Patient the Pain of making a Suture, when the Tendons of the Flexors, or Extenſors of the Fingers or Toes, are divided; ſince they may be brought to unite, by retaining them together with Splints, Compreſs and Bandage. But when a Tendon is punctured, contuſed, or but half divided, and Convulſions, with other malignant Symptoms follow; if they cannot be removed by proper Remedies (ſuch as *Ol. Terebinth. cum guttulis paucis Ol. diſtillat. ſuccin. aut Lavend.* [a]) it will be then neceſſary to make a total Diviſion of them, and, when the Symptoms are vaniſhed, to join them together again by Suture.

III. The Method of uniting divided Tendons by Suture is as follows. In the firſt Place the wounded Member is to be inflected or extended, that the two Extremities of the Tendon may meet each other: but if the upper End of the Tendon, attached to its Muſcle, be contracted and drawn under the Skin, in ſuch a Manner, that it cannot be drawn down, or entered by the Needle, in that Caſe an Inciſion is to be made to take hold of it with the Pliers, drawing it gently downwards. But GARENGEOT thinking this Treatment too rough, draws down the Tendon by paſſing a Needle and waxed Thread through it, though the ſame may be done gently with the Pliers without any ill Conſequences. But, before we proceed any farther, it muſt be obſerved, that there are two Methods of making the Suture, either with one, or with two Needles. The firſt Method, with one, is by threading a ſmall, ſtraight, and common Needle, either flat, or round at the Point, (*Tab.* XXXVI. *Fig.* 2. AA) with Slender, but ſtrong and double Thread or Silk BB, being waxed, armed with a large Knot marked C. This Needle and Thread are to be paſſed through a Bit of Leather D, up to the Knot C [b], that the ſaid Knot may not eaſily ſlip through the Tendon; ſee *Fig.* 4. A, and *Fig.* 7. DE. The wounded Hand is in the next Place to be extended flat upon a Table, or faſtened in that Poſture to a Ferula, or a Piece of Paſteboard, that the divided Ends of the Tendons on the Back of the Hand, *Fig.* 4. may meet together: then the armed Needle is to be paſſed through the Middle of the upper End of the Tendon, a little more than the Tenth of an Inch from the Edge where it was divided; and applying a ſtitching Quill or Cannula, (*Tab.* VIII. C.) to the oppoſite Side of the Tendon, the Needle is to be entered from without towards the internal Part, as in *Tab.* XXXVI. *Fig.* 4. A, after which it is to be paſſed in like Manner through the lower End of the Ward. Then placing a ſmall Compreſs of Linen, Silk, or ſoft Leather [c], either dry or ſpread with Cerate, under the Thread as in the knotted Suture, *Tab.* II. *Fig.* 22. the Thread is to be tied thereon with a ſingle Knot, and then with another Slip-knot, as repreſented by the Letter B. Laſtly, after the Wound has been cleanſed, it is to be dreſſed with *Balſ. Capiv.* or ſome other vulnerary Balſam, applied warm with Lint and Compreſſes; faſtening under the whole a Ferula, or Piece of ſtiff Paſteboard, adapted to the Form of the Hand, *Fig.* 5. with Compreſſes, to elevate the Fingers, and concluding the Opera-

The firſt Kind of Suture.

[a] *Ol. Tereb. cum Aq. Hungar. miſſ.* is alſo excellent: DUVERNEY recommends *Balſ. Capiv. cum. Ol. Ovor.*

[b] Some uſe a thin Plate of Lead inſtead of Leather, as MEEKREN, *&c.*) others, as VERDUC, uſe a ſmall Linen Compreſs.

[c] MEEKREN obſerves, that a crooked Needle was uſed by MAYNART, and the Needle figured by DIONIS is crooked.

tion

tion with a proper Bandage. It is to be obſerved, that a ſmall crooked Needle may be alſo uſed for this Operation, like that repreſented at *Fig.* 6. having a flat Point. If the Needle paſſes difficultly through the Tendon, you may uſe the Inſtrument *Tab.* VI. *Fig.* 3. If the Wound has been inflicted ſeveral Days before, and the Ends of the Tendon are become indurated, it may then be proper to cut off juſt the indurated Surface with a Pair of Sciſſars, before they are joined together by Suture, that they may the more ſpeedily and intimately coaleſce or unite; or, if the Wound is in Part healed up, or the Tendon adheres, an Inciſion and Separation is to be cautiouſly made, to ſet the Tendon at Liberty before the Operation.

Garengeot's Method.

IV. M. Garengeot thinks he has improved and corrected the preceding general Method of performing the Suture of a Tendon, which he propoſes in the following Manner. He thinks the Tendon ought not to be laid bare, nor pinched with a Pair of Pliers: and that it is a much ſafer and milder Method to join it, together with the external Integuments by Suture, according to the Directions which we have before given for that Purpoſe on Wounds. But Garengeot is not the firſt Starter of this Obſervation; for Chalmet [a] long before taught, that when a Nerve or Tendon was cut through tranſverſely, it ought to be reunited [b] if poſſible, together with the adjacent Fleſh, by Suture, which is alſo the Advice of Verduc and Charriere. But, to effect the Operation with more Eaſe, M. Garengeot adviſes the Uſe of the ſtitching Quill, *Tab.* VI. *Fig.* 3. by the Aſſiſtance of which the Needle may be better conducted through the Lips of the Wound, than by the bare Fingers. A crooked Needle with a flat Edge, *Fig.* 6. is here preferred before the common crooked Needle, whoſe Point or Edge is annular, *Tab.* I. STU; becauſe the firſt Sort of Needle does not divide ſo many Fibres of the Tendon, as the laſt. When the greateſt Part of the double Thread has been paſſed through the Integuments and Tendons, a Compreſs of Silk ſpread with Cerate, and convoluted into a Cylinder, is to be applied in it, as in a Loop, for ſuſtaining the Ligature on the Lips of the Wound, as at *Tab.* XXXVI *Fig.* 4. C. When the Thread has been paſſed in like Manner through the lower Part of the Tendon, the two Parts being drawn together, ſo as not to ride over each other, and a cylindric Compreſs placed betwixt the Thread, the whole is then to be ſecured with two Knots, the one a ſingle, and the other a ſlip Knot. But it ſeems to me a little ſurpriſing, that Garengeot ſhould adviſe with Vauguion, Verduc, Charriere, and Dionis, that the divided Parts ſhould ride over each other, when that muſt apparently impede the Agglutination; and, upon which account, it has been juſtly rejected by the ſkilful Anatomiſt and Surgeon Mr. Cowper, who happily reunited the *Tendo Achillis* by Suture, without it [c]. But if the divided Ends of the Tendon have, through Neglect, become callous, and adhere ſo to the neighbouring Parts, that they cannot be reunited to each other; in this Caſe ſome of the above-mentioned

[a] *Enchirid. Chirurg.* Lib. II. Cap. xi. publiſhed at *Paris* in 1564. Chalmet prudently adds, *if poſſible*; for the Tendon is frequently ſo much drawn up, as to leave a Space of two Inches, as Mr. Cowper relates.

[b] He very judiciouſly adds, *if poſſible:* for very often the Tendon is ſo contracted and drawn back, that it cannot be united by this Method of Suture; but there is an abſolute Neceſſity of laying it bare.

[c] *Phil. Tranſ.* No. 252. Lowthorp's Abridgement, Vol. III. pag. 298.

Surgeons

Surgeons adviſe, firſt to ſeparate the Tendon from the adhering Parts, and, after cutting off the callous Ends, to apply the Suture in the Method juſt propoſed. This Kind of Suture may be alſo conveniently made with two ſquare Bits of Leather applied to each End of the Thread and Compreſs under the Knot, as in *Fig.* 3. AB, and *Fig.* 7. The Kind of Suture for Tendons deſcribed by DIONIS is, of all the Methods, the moſt ſimple, reſembling the Suture we have propoſed for common Wounds: *viz.* to paſs a convenient Needle, furniſhed with a ſingle waxed Thread through the Middle of the upper End of the divided Tendon from without inwards, and then to paſs it through the other End from within outwards at one Stitch; after which, the Needle being removed, the Thread is to be drawn, ſo as to conjoin the two Ends of the Tendon, and then tied upon a round Compreſs. But the preceding Methods are generally preferred before this.

V. The Suture of a Tendon by two Needles was firſt deſcribed, as far as I can find, by NUCKE, who directs two Needles to be paſſed one through each End of the divided Tendon. He ſays, a Thread of ſtrong and thick waxed Silk is to be paſſed through the Eyes of two ſlender and common Needles, both which are to be paſſed inward through the upper Part of the Tendon, *Fig.* 4. E, and outward through the lower End of the Tendon F. but the two Needles are paſſed through on each Side the Edge of each Part of the Tendon. Then, removing the Needles, a Knot is made with the Thread upon a Compreſs of Leather, as we directed before. He prefers this Method to the preceding, as he thinks the Ends of the Tendon are hereby held more firmly together, without being apt to lacerate. When the Suture is finiſhed, he ſprinkles on *Pulv. ex Tereb. coct.* and dreſſes the Wound with *Linimentum Arcæi*, or common Digeſtive, and ſecures the Parts from being diſplaced by Compreſs, Splints, and Bandage. Though there are ſome, who prefer the Suture with one Needle for Tendons in the Hand, as being leſs troubleſome to the Patient and Surgeon: yet I think this Method may be uſeful in the larger Tendons. When there are ſeveral Tendons divided, the Suture is to be made upon each of them ſeparately. The Suture with two Needles.

VI. For the Dreſſings after the Suture, the Parts are to be firſt treated with Lint dipt in *Ol. Tereb. vel. Balſ. Capiv.* over which is to be applied a Compreſs dipped and expreſſed out of warm Spirits of Wine. In the mean Time the Palm of the Hand is to be expanded and ſupported upon a ſtiff Paſteboard, *Fig.* 5. with Compreſſes and Bandage: and, laſtly, the whole Arm is to be fomented with warm Spirit of Wine, or *Oxycrate*, and wrapped up in linen Cloths dipped therein; and indeed ſome uſe *Ol. lumbricor.* not without Succeſs. And thus the Parts are to be retained till the divided Tendon appears to be united, which may be known by the Looſeneſs of the retaining Threads, which ought then to be cut, and cautiouſly extracted: and the Compreſs which ſuſtained the Knot, is to be likewiſe carefully removed; the Hand being afterwards ſuſtained on the Paſteboard till the Wound is healed, with vulnerary Balſams and ſcraped Lint, as in others. M. GARENGEOT deſcribes [a] a particular Machine for retaining the Hand and Arm in a convenient Poſture, with the Fingers extended, and a little reflected: but as this Intention may be very well anſwered by the Means before deſcribed, I ſhall not inſiſt on the Inſtrument, though it may be well enough adapted to the Deſign of its Author. If any Stiffneſs or Rigidity impede the Treatment after the Suture.

[a] In his *French* Treatiſe on *Chirurgical* Inſtruments, Tom. II. pag. 290.

Motion of the Part afterwards, it will be highly uſeful to rub in *Unguent. Dialthææ, Ol. Hyperic. vel Lumbric. vel Amygdal.* &c. every Day till it be removed. Laſtly, it is not a little ſurpriſing, that many [a], even of our modern, and otherwiſe expert *Italian* Surgeons, ſhould, with the Ancients, reckon this Operation fabulous and impracticable, when there are Inſtances of its Succeſs given us by Authors of the moſt undoubted Credit and Veracity. They who deſire more, may conſult a profeſſed Diſſertation on the Subject by KISNERUS; as alſo GOELICKIUS Diſſ. *de Tendinum Affectibus.*

CHAP. CLXXIII.

Of Diſorders belonging to the lower Extremities.

WE have before delivered the Method of amputating, bleeding, and treating other Diſorders in the Leg and Foot. It now remains for us to conſider the Nature and Treatment of what other Diſorders are yet peculiar to thoſe Parts.

Of Sutures in the Tendons of the Leg, particularly the Tendo Achillis, *and* Extenſores Tibiæ.

Tendo Achillis how wounded.

I. Some of the Tendons in the Leg are alſo no leſs liable to be wounded than thoſe of the Hand, particularly the *Tendo Achillis*, and Tendon of the *Extenſores Tibiæ*. By the *Tendo Achillis* we mean, that vaſt large Tendon extended from the Calf of the Leg down to the Heel, and ſo called from the *Grecian* Hero ACHILLES, who is ſaid to have been killed by a Wound thereof. When this Tendon is divided, the Patient cannot move or extend his Foot, to thruſt forward his Body, and, if it be not again united, he muſt continually halt, or go lame. I know GARENGEOT [b] indeed writes, that a certain Surgeon of *Paris* made a Cure of a Patient, who had a Fracture of the *Os Calcis*, by removing the Fragment of the Bone, and dividing this Tendon, the Patient afterwards being well without making any Suture, or any Defect remaining in the Limb. But I know not what to make of his Account; for I can ſee no Reaſon why a Surgeon ſhould divide this Tendon in a compound Fracture of the *Os Calcis:* and the Relation ſeems to leave us in Suſpenſe, whether or no he approves of a Suture in this Tendon. I could indeed wiſh, that this Author, who is, in many other Caſes, of leſs Conſequence, minute enough, had condeſcended to have given us a more exact Account of this wonderful Cure; and that he would expreſs himſelf a little more intelligibly. BORELLI [c] alſo obſerves an Amputation of a mortified Part in the great Tendon (I ſuppoſe the *Achillis*) and that, after the Wound was healed, the Patient could walk without any Impediment, the

[a] As ARCÆUS Lib. II. Cap. MARCHETTI, *Chirurg.* Obſ. 63. GENGA, in *Comment. ad Aphor.* HIPPOCRAT. PECCETUS in *Chirurg.* Lib. II. Cap. xlvii.

[b] *Operat. Chirurg.* Edit. 2. Tom. 3. pag. 267.

[c] *Obſervat.* Cent. II. Obſ. 2.

Tendon being renewed, or filled again with a ſimilar Subſtance. The *Tendo Achillis* may be wounded in various Manners, and attended with various Symptoms. When it is punctured, perforated, or but partially divided, the Patient is then afflicted with moſt grievous Symptoms, excruciating Pains, Convulſions, Fever, Gangrene, and perhaps Death itſelf; for the Symptoms muſt be worſe here than in Punctures of other Tendons, as this is much larger. From whence the Ancients ſeem to have taken their Notion, that Wounds of the *Tendo Achillis* muſt be mortal, or at leaſt highly dangerous, as being the largeſt of any in the Body; eſpecially as they read or heard, that ACHILLES died of a Wound in this Part. The Symptoms attending a total Diviſion of a Tendon, are uſually much milder than thoſe of a punctured or half-divided Tendon: and therefore the Pain and Convulſions attending the laſt may be frequently removed in a ſhort Space, by cutting it quite in ſunder, when the Application of no Remedies will take effect. If therefore the *Tendo Achillis* ſhould be imperfectly divided, and malignant Symptoms ſupervene, they will diſappear upon cutting it quite through: but then it muſt be joined again afterwards by Suture, which will not excite any of theſe malignant Symptoms. But why the Puncturation of a Tendon by a Needle, in making the Suture, ſhould not be followed with the like bad Symptoms, as other Punctures inflicted by Accident, I muſt, with the Generality, confeſs myſelf ignorant, though we are certain of the Fact from Experience. Thoſe, therefore, who judged by Analogy, deemed this to be ſo dangerous and unſucceſsful an Operation, that they durſt not attempt it. Even PAREY[a] himſelf, who was otherwiſe a bold Operator, declined this Suture on the ſame Account: and the expert Anatomiſt VESLINGIUS[b] was aſtoniſhed to ſee the *Tendo Achillis*, and that of the *Extenſores Tibiæ* conjoined by Suture, which he eſteemed a raſh Undertaking, till he was convinced of the contrary by Experience. But that a wounded *Tendo Achillis* may be alſo conjoined, like many other Tendons, without making a Suture, may be concluded from Analogy, and the forecited Caſes of GARENGEOT and BORELLI; provided the Foot be bound up in an extended Poſture, ſo as to make the divided Ends of the Tendon meet each other.

II. If the Surgeon ſhall judge a Suture of the Tendon to be neceſſary, the Performance of it may be with little or no Variation from the Suture of the Tendons in the Hands, before deſcribed in Chap. CLXXII. preceding; except that the Needle (whether ſtraight, *Fig.* 8. A. crooked or flat, *Fig.* 6 and 9.) and Thread are to be here proportionably larger and ſtronger than for the ſmaller Tendons. The Operation itſelf may be conducted in the ſame Manner as we have directed in the Chapter preceding. The firſt Account of this Operation performed on the *Tendo Achillis*, and *Extenſores Tibiæ*, that I can meet with, is given by VESLINGIUS, the laſt of which he ſaw performed in *Africa*. But after him we have Accounts of the Operation being ſucceſsfully performed, not only by Mr. COWPER of *London*, after the Manner of NUCKE, ſee *Tab.* XXXVI. *Fig.* 10, C D, with two Needles; but alſo by M. THIBAUT and COSTIUS of

Suture of the Tendo Achillis.

[a] See Lib. IX. Cap. xxxvi.

[b] Epiſt. & Obſervat. XV.

Paris, according to the Relation of M. GARENGEOT [a]. As the Accounts we have of this Operation are so few and imperfect, it being, totally omitted in many of our modern Systems; I shall therefore here insist upon it the more largely, and describe the remarkable Case given us by Mr. COWPER, as being the fullest and most exact I can meet with. But as even in this there are several Defects and Obscurities, I shall endeavour to supply and illustrate them.

A Case of Mr. COWPER's

III. Mr. COWPER's Case is of a Man thirty Years old, who had a total Division of the left *Tendo Achillis*, about three Finger's Breadth above the *Os Calcis*, the superior Part of the Tendon being drawn up, at least two Inches from the Inferior, as in *Fig.* 10. AB. The necessary Apparatus being ready for the Operation, Mr. COWPER first divides the Integuments *a*, *b*, which invest each End of the Tendon AB, that he may have free Access to the latter, and join them again by Suture [b]. This done, he then takes the first Needle C, (which, like the other marked D, is straight and [c] Slender) armed with a Piece of waxed Silk, and passes them through the upper Part of the Tendon A, about half an Inch above where it was divided [d], guiding the Needle from without towards the inner Side of the Tendon [e]. He then passes the other Needle and Thread D of the same Kind, and in the same Manner through the upper End of the Tendon, but a little lower than the first. After this he passes both the same Needles through the lower End of the Tendon B; and, the Foot being extended, the two Ends of the Tendon, were made to meet each other, by drawing the Threads, which were afterwards tied in such a Manner, as to retain the Ends close, whilst the Foot continued in this Posture. The four Ends of the Threads were next cut off [f], and the Wound dressed with Lint dipped in *Balf. Tereb.* retained with Compress and Bandage. And, lastly, to sustain the Patient's Foot in such an extended Posture as to keep the Ends of the Tendon together, he contrived a sort of Arch of stiff Pasteboard; which, being applied to the anterior Part of the Leg and Foot, held the latter extended and inflexible, preventing a Rupture of the Threads or Suture. He observes, that the Patient

[a] In *Operat. Chirurg.* Edit. prim. Tom. II. pag. 221. But in describing the same in his second Edition he has omitted the Name of THIBAUT.

[b] Some of the moderns, and particularly GARENGEOT, disapprove of this Incision, as being apt to induce many Inconveniences; but it is apparent from the present Case, that nothing dangerous is to be feared from it; and if the End of the Tendon is drawn up so high as we are here informed, the Suture cannot be well performed without such an Incision.

[c] GARENGEOT prefers crooked and large Needles for this Suture; but it appears from this Case, that such as are straight and slender will do; though crooked ones may be more handy.

[d] There is here no mention made of the *Acutenaculum*, which GARENGEOT thinks so Necessary for this Suture; and therefore it is probable Mr. COWPER did not use any; yet the Operation succeeded.

[e] Mr. COWPER does not indeed relate this in Words. But it is apparent from the Figure; though even the Figure does not shew what Part of each End of the Tendon was perforated by the Needle C, *i. e.* neither where it entered, nor where it came out.

[f] In what Manner Mr. COWPER tied these Ends of the Threads, whether C with D, or C with C, and D with D, we are not told, either in Words, or by the Figure; but it seems to me to have been C with C, and D with D: otherwise he could not have extracted them separately one after the other, as he presently relates. Mr COWPER also differs from other Surgeons, in this Operation, chiefly in making his Knots, or tying the Ends of the Threads, without any Compress of Leather, Cork, Linen, *&c.* He also tells us when and how to extract the Threads after the Operation; which is a Circumstance neglected by others.

complained

complained of a great Pain in paſſing the Needles through the upper End of the Tendon; but felt no Pain in paſſing them through the lower End. After taking fourteen Ounces of Blood from the Patient's Arm, he left him on his Bed, and ordered an Ounce of *Syr. de Mecon.* to compoſe him in the Evening. The next Morning the Patient told him, he had got ſome Sleep in the Night, and complained of nothing but that he was often awakened with Twitchings in the Calf of the wounded Leg. The third Day after the Operation he was dreſſed the ſame as at firſt, only with the Addition of a Fomentation, made of a Decoction of Wormwood, Sage, Roſemary, Bay-leaves, *&c.* On the fourth Day the Dreſſing on the Wound appeared very wet with Synovia, or Gleeting from the Tendon. On the ſixth Day the Matter became thicker, and ſtill thicker on the eighth, the Gleet gradually diminiſhing. About this Time the two Ends of the Tendon were not a little dilated, and a white Slough appeared on it towards the upper Part of the Wound; to which was applied *Tinct. Myrrhæ*, inſtead of *Balſ. Tereb.* Some time after, the Slough caſt off, and the two Ends of the Tendon appeared overſpread with a fungous Fleſh. He then dreſſed the Wound with drier Applications than before, uſing ſometimes Lint only, and ſometimes *Pulv. Terebinth. coct.* On the tenth Day one of the Threads in the Suture appeared looſe, which he therefore divided and extracted; and, in two or three Days after, the other Thread appeared flaccid, which he therefore removed in like Manner, retaining the Foot all that Time well extended by the Paſte-board Arch[a]. He was often obliged to apply mild Eſcharotics, to diminiſh the Fungus on the Tendon: and, in leſs than thirty Days, he began to walk about, though as yet but lamely. However, this was much abated towards the End of the ſecond Month, and he afterwards gradually recovered all the Motions of his Foot, and ſhewed little or no Lameneſs in walking. AMB. PAREY, on the other Hand, gives us an Account of this Tendon divided by a Sword, and healed with much Difficulty without a Suture: but after the whole was cicatrized, when the Patient was riſing out of Bed, it broke open again. See Book 9. Chap. 36. of his *Surgery*.

IV. VESLINGIUS gives but a very imperfect Deſcription of the Suture, which he ſaw made in the *Tendo Achillis* and *Extenſores Tibiæ*; ſaying only, that "I "ſaw that Tendon, which is formed by the *Gaſtronemii* and *Solei Muſcles*, unit-"ed by ſome Sutures made by certain Surgeons, after it had been cut aſunder "a little above the *Os Calcis*; in a Writer belonging to my Father: and, in "like Manner, I ſaw the Tendon of the *Extenſores Tibiæ*, which had been divid-"ed tranſverſely by a Scimetar under the *Patella* at the Knee, in an *Arabian*, "drawn afterwards together, and united with Sutures by a Surgeon of *Tu-*"*nis*." From which Relation we learn, that ſeveral, or more than one Suture was uſed; but this is a very ſuperficial Account: VESLINGIUS takes no Notice how they dreſſed and treated the Wound. We have another Method of making the Suture on a divided *Tendo Achillis*, deſcribed by my late Friend KISNERUS, formerly Phyſician at *Francfort on the Main*, which we have here inſerted from his Treatiſe, *de Tendinum Læſionibus*, and repreſented in our *Tab.* Other Methods.

[a] It is obſervable, that this Paſteboard is not mentioned by other Writers, though abſolutely neceſſary, to extend the Foot in and after this Operation; nor do I find any Notice taken by others, concerning the Application of Eſcharotics to take down a Fungus of the Tendon.

XXXVI. *Fig.* 7. By which the whole Buſineſs is ſo clearly exhibited to any one that has read the foregoing Chapter, that, in my Opinion, it needs no other Explication. But we may obſerve, that the lower End of the Tendon D E, is here perforated with the Needle firſt, contrary to the Method propoſed by the Generality of Writers, who direct to enter the Needle through the upper End of the divided Tendon before the lower; and then to make a Slip-knot with the Thread upon a Compreſs of Leather or Linen, on the lower End of the Tendon, which is here made the upper. And though it cannot be denied, but that the Operation may be well enough performed, in the Method here propoſed by KISNERUS; yet I muſt think, agreeable to the Practice of Mr. COWPER, that it may be more commodiouſly performed, by beginning with the upper End of the Tendon firſt.

Suture of the Tendo Extenſores Tibiæ.

V. For making the Suture upon the divided Tendon of the extenſor Muſcles of the *Tibia*, which is a Caſe barely mentioned by VESLINGIUS, I cannot meet with any particular Directions given by any Author whatever. But I conceive it may be performed much after the ſame Manner with the preceding; only as this Tendon is broader than the *Tendo Achillis*, it cannot well be conjoined in all its Parts, without making a double Puncturation thereof with the Needle and Thread, after the Manner of NUCKE, *Tab.* XXXVI. *Fig.* 4. *lit.* E and F. The Wound may be afterwards treated as in the Caſe of Mr. COWPER, Sect. III. or according to the Directions we have given for Sutures on the Tendons of the Hand. But, in the mean Time, the Ham muſt be exactly extended, ſo as not to have the leaſt Motion, by means of Splints of Wood, or ſtiff Paſteboard and Bandage, as in a Fracture of the *Patella*, keeping the whole Limb at reſt. Though I make no doubt, that, if the two Ends of the Tendon were thus retained together, and the Leg kept extended in this Poſture, the Tendon would unite, and the Wound heal, without making any Suture; and the ſooner, becauſe the Tendon being connected to the *Patella*, will not fly back, or recede ſo much when divided as the *Tendo Achillis*: and therefore the Ends of the former may be more cloſely and commodiouſly approximated, and retained together by Bandage, than thoſe of the latter, eſpecially if the Foot be confined in a Straw-caſe. See *Plate* XXXVIII. *Fig.* 20.

Of Sutures on the Ligaments.

VI. By way of Appendix to this Chapter, I ſhall conclude with obſerving, that it is my Opinion divided Ligaments may be almoſt as eaſily conjoined by Suture, as Tendons; and ſince their Subſtance or Texture are pretty much alike, divided Ligaments may be ſewed and treated in the ſame Manner as Tendons, and that not without Succeſs, in the Opinion of myſelf and others [a]. But in Sutures of the Ligaments it may be beſt to uſe two Needles, armed with one Thread, as in *Gaſtroraphia*. This Kind of Suture is alſo preferred by GARENGEOT [b] for Tendons; ſo that each End of the divided Tendon, or Ligament, is to be perforated by paſſing the Needles from their internal Margin: and, after drawing the Ends of the Thread ſufficiently tight, you ſhould faſten them by Knots, conducting the reſt of the Treatment as before in the Tendons.

[a] As KISNERUS Diſſert. *de Tendinum Læſionibus*, Sect. 30. VALENTINI in *Chirurg.* pag. 821. AQUAPENDENS, *&c.*

[b] *Operat. Chirurg.* Tom. III. Edit. 2. pag. 278.

CHAP.

CHAP. CLXXIV.

Of Varices.

I. THE Name *Varices* is by Surgeons given to thoſe unequal or knotty and livid Protuberances of the Veins, which are formed in all Parts of the Body, but moſt frequently in the Legs, near the Ankles, and often highly near the Knees, or in the Thighs, Scrotum, Abdomen, and ſometimes the Head, as CELSUS[a] obſerves. Women with Child are the moſt liable to this Diſorder, but it alſo frequently happens to plethoric Men, or thoſe who are hypochondriacal, have an inſpiſſated or viſcid Blood, and an Obſtruction, or a Scirrhoſity of their Liver. The larger theſe Protuberances of the Veins grow, the more painful and troubleſome they prove, by the greater Diſtraction of Coats or Membranes of the Veſſel, which are ſometimes quite ruptured, and occaſion a profuſe Hæmorrhage, or an Ulcer, as I have ſeveral times experienced. Thoſe which are ſmall, giving the Patient no Pain or Uneaſineſs, are uſually neglected by him, and do not require any Aſſiſtance from the Surgeon. Varices deſcribed.

II. To prevent the Diſorder from running to any great length, when it is once on foot, it may be proper to bleed the Patient, preſcribe a proper Regimen and Diet, and to apply an expulſive Bandage cloſe to the diſordered Legs, (as at *Tab.* III. *Fig.* 1. F.) and as the Bandage ſlackens, to draw it tighter by Degrees, and not to leave it off till the Diſorder is without Danger. We learn from CELSUS, that the Practice of the Ancients was either to cauterize, or extirpate them with the Knife: but our procedure at this time of Day is much milder. In large Varices, we endeavour to contract and ſtrengthen the dilated Coats of the Veins, by the Application of the ſaid expulſive Bandage with Fomentations of red Wine, and aſtringent Medicines, eſpecially Vinegar and Alum, and by binding a thin Plate of Lead on the diſtended Veſſel. DIONIS here recommends a ſort of leather Stockings, which, being tightened at diſcretion by the Lace, are to be wore Day and Night. See them repreſented in *Tab.* XXXVI. *Fig.* 11. Though the ſame Stockings may be alſo conveniently made of ſtrong brown Linen in the ſame Form, as I have ſeen. Dr. HARRIS thinks *Tinct. Myrrhæ* a very potent Remedy for Varices, if it be often applied with a Feather, and the Part covered with *Emplaſt. Diaſulph. Rulandi*; which will ſtill ſucceed better with Bandage, or the ſtrait Stocking. Method of Cure.

III. But when the Varices are enlarged to an enormous Size, ſo as to give the Patient great Uneaſineſs, and threaten a profuſe Hæmorrhage, with other bad Symptoms; it will then be neceſſary to lay the worſt of them open by a longitudinal Inciſion with the Scalpel, or a Lancet. Then taking away about eight or ten Ounces of the grumous and viſcid Blood, more or leſs in proportion to the Patient's Strength and Habit, the Wound is to be dreſſed with *Bol. Armen. & Acet.* applied on ſcraped Lint, to be retained with a Plate of Lead, Cure by the Knife.

[a] Lib. VII. Cap. xxxi. & Lib. V. Cap. xxvi. circa initium, ubi ait: *Cum vena intumiſcit, in Varicem convertitur.*

Compreſs,

Compreſs, and Bandage. And thus the Vein unites again, as in Bleeding, and forms a Cicatrix ſtrong enough to reſiſt any farther Dilatation, and capable of preventing the like Diſorder, at leaſt in that Part of the Veſſel. The Ancients cured Varices either by Inciſion or Cauterization, as Celsus obſerves, (*Lib.* VII. Cap. xxxvi.) In the firſt Method they divided the Skin upon the Tumor; and, elevating the diſtended Vein with a Hook, they freed it by a Scalpel from the adjacent Parts, and then cut it out, healing up the Wound with a Plaſter. Gouieus tells us, that the moſt ſafe and ready Method of curing Varices is, by paſſing a crooked Needle with a double waxed Thread under the lower Part, or ſmall End of the diſtended Vein, and then to make a ſtrong Ligature on the Veſſel with the Thread: after which the Varix is to be laid open with a Lancet, the grumous Blood removed, and the Wound well dreſſed with ſome digeſtive Ointment, with which it is to be treated till it is near healed up. The Method of curing Varices by Cauterization, uſed by the Ancients, is thus deſcribed by Celsus (*loc. cit.*) They firſt divided the Integuments, and, having denudated the Varix, or diſordered Part of the Vein, they then applied to it a ſmall and flat Cautery, or red-hot Iron, with which they avoided touching the Lips of the Wound, by drawing them ſideways by Hooks: and, laſtly, the Dreſſings were made with the Medicines uſually applied for Burns. Dr. Harris thinks this Treatment of Varices, by Inciſion and Cauterization, to be raſh and cruel: but they are ſometimes ſo large and painful to the Patient, as not only to hazard his Life, by burſting in the Night, as I remember an Inſtance, but alſo to prove incurable by any other means than the Knife and Needle.

Prevention. IV. In order to prevent the Return of Varices when they have been once cured, it is highly neceſſary for the Patient to avoid plentiful and groſs Feeding; rather preferring Drinks or Suppings, with Tea, Coffee, and light vegetable or animal Food, uſing frequent Exerciſe, with Frictions of the Legs, and bleeding at convenient Intervals, eſpecially Spring and Fall. The ſame Cautions are alſo neceſſary to be obſerved by thoſe, who are but juſt beginning to be afflicted with this Diſorder; if they are deſirous of preventing greater Evils, and of avoiding the Severities of the Knife or Cautery. Muys tells us, that he opened a Varix combined with an Ulcer once every Year, and diſcharged a Pound of Blood; by which the Eruption of the Ulcer was prevented. See his Rational and Practical *Surgery*, Decad I. Obſ. 6.

CHAP. CLXXV.

The Method of cutting out the Nail of the Great-toe, when it turns into the Fleſh.

Nature and Cure of the Diſorder. I. THE Great-toe Nail ſometimes turns too much in on one Side, ſo as to enter the Fleſh, and cauſe violent Pain and Inflammation to ſuch a Degree, that the Patient cannot walk. The moſt general Cauſe of this Diſorder is the wearing of too ſtrait or narrow-toed Shoes, which they will do well to avoid, who are deſirous of being free from the Complaint. But, in order to

ſet

ſet the Nail at Liberty from the tender Fleſh, into which it has fixed itſelf, the Patient's Foot is firſt to be held half an Hour in hot Water, to mollify the indurated Nail and Skin: and that the Water may penetrate the farther, it may be proper to ſcrape off the outer Surface every two or three Minutes with a Penknife, or a Piece of Glaſs. Then the inflected Nail is to be gently elevated with the Finger, or a Probe, and a Piece of ſoft dry Lint interpoſed betwixt it and the Fleſh, and ſo bound up with a Compreſs dipt in warm Spirit of Wine: which Operation is to be repeated again the next Day, till the Pain and Inflammation diſappear.

II. If the Method before preſcribed prove inſufficient to remove the Diſorder, we muſt then have recourſe to the Knife. In order to which, the Foot, being macerated in warm Water, as before, is then to be placed and held in a convenient Poſture upon a Chair by the Hands of an Aſſiſtant, and the Operator muſt inſinuate the ſtrong Nail-ſciſſars, *Tab.* XXXVI. *Fig.* 12 and 13. gradually under the injurious Part of the Nail, to cut it off, and then extract it, if it does not come away of itſelf with a Pair of Pliers. Though the Operation itſelf may give the Patient no ſmall Pain for a ſhort Time, yet he will quickly perceive the Advantage by a more laſting Eaſe. The Part is next to be dreſſed with ſcraped Lint, or Linen Compreſſes, dipped in *Oxycrate*, or warm Spirit of Wine, with *Aqu. Cal.* and, in urgent Caſes, it may be fomented two or three Times in a Day, till the Pain and Inflammation are removed. In the mean Time the Patient muſt not walk upon his Foot, till there is no Danger of the Pain and Inflammation returning. If any luxurious Fleſh grow up in the Cure, it may be taken down with *Alumen uſtum.* And, to prevent the Diſorder from returning again for the future, the wearing of eaſy Shoes, with waſhing the Feet, and paring the Nails once a Month, are, by Experience, as well as the Word of M. Dionis, confirmed to be the ſtrongeſt Preſervatives. But it muſt be obſerved, that the Nail of the Great-toe ought to be ſcraped very thin, either with a ſharp Knife, or a Piece of Glaſs, that it may not have Reſiſtance enough to run into the Fleſh again by the Preſſure of the Shoe.

Cure by the Knife.

CHAP. CLXXVI.

Of treating Corns *in the* Feet.

I. IT is not unfrequent for People to be troubled with hard Tubercles, like flat Warts, in ſeveral Parts of their Feet, eſpecially upon the Joints of their Toes; which are generally termed *Corns*, from their cornuous or horny Subſtance, and by the *Latins*, *Clavi*[a], from their Figure, penetrating down into the Fleſh like a Nail, or Spike. This Diſorder, as well as the preceding, is not unjuſtly attributed to the wearing of too ſtrait, or narrow-toed Shoes, which never fail to produce theſe Tubercles, with their unwelcome Torments; eſpecially if the Perſon is obliged to ſtand or walk much, and in the Summer Time.

Corns deſcribed, with their Cauſes.

[a] See Celsus Lib. V. Cap. 28. N. 14.

Cure. II. Various are the Methods uſed for removing theſe Calloſities of the Skin and Cuticle, ſome by the Knife, and others by the Application of emollient and cauſtic, or eroding Medicines. But, which ever way they are removed, it is certainly much the beſt, to let their hard Subſtance be firſt ſufficiently mollified. And this may be obtained by frequently macerating them for a conſiderable Time in warm Water, and afterwards paring off their uppermoſt and hardeſt Surface with a Penknife, which will often make them quite eaſy for a Time. But if this does not ſuffice, you may apply a Plaſter of green Wax, *Gum Ammoniac. de Sapon, Emplaſt. de Mucilag.* &c. or a Leaf of Houſe-leek, to be renewed every Day. After theſe Applications have been continued for ſome Time, you may then venture to peel them away with your Finger-nails, or cut and ſcrape them with a Scalpel; but with great Caution, to avoid injuring any of the ſubjacent Tendons of the Extenſor-muſcle, which might occaſion violent Pains, Inflammations, Convulſions, a Gangrene, and even Death. All which have alſo been frequently the Conſequences of Cauſtics penetrating to theſe Parts, ſuch as *Ol. Vitriol. Aqu. Fort. Arſenic*, &c. as HILDANUS obſerves, *Cent.* VI. Obſ. 100. It muſt be confeſſed, that the Treatment of Corns by thus ſoaking and paring them, with the Application of Emollients, does not very often totally remove them, but that they will grow up again in a ſhort Time. However, the Patient is ſure to be ſafe in this Practice, which ſeldom fails, either totally to extirpate them in proceſs of Time, or at leaſt to make them eaſy and tolerable, provided he wears eaſy Shoes, and repeats the Operation once a Month, or as often as they give him any Uneaſineſs. But if the Patient will take the Pains to waſh his Feet, and ſoak the Corns well every Evening in warm Water and Bran, then to ſcrape off the ſoft Surface, and apply a freſh Plaſter, he will go near to be quite rid of them in Time, provided he does not renew them by wearing ſtrait Shoes.

CHAP. CLXXVII.

Concerning the Treatment of Infants that are Bandy-legged, *with their Feet turning inward or outward.*

MANY Children have their Feet diſtorted, or turned on one Side, either from ſome Defect in the Birth, or from the Imprudence of the Nurſe, endeavouring to make the Child ſtand and walk, before its Legs are ſtrong enough to ſupport the reſt of its Body. In ſome the Legs themſelves are crooked, and in others the Knees are diſtorted. Thoſe who have their Feet diſtorted inward, at the Articulation of the *Tarſus* with the *Tibia*, are denominated *Vari*; as thoſe who have them diſtorted outward, are termed *Valgi*. The Nature and Treatment of this Diſorder differs according to the particular Parts affected. The beſt Method of preventing it, will be by keeping weak-limbed and ricketty Children from a too early and frequent Uſe of their Legs in ſtanding or walking. On the contrary, let them always ſit or lie down, and be carried either in the Arms, or ſome Vehicle, till the Bones are become ſtrong and firm by Age. But

Fig. 1.

Fig. 5.

Fig. 2.

Fig. 6.

Fig. 9.

Fig. 3.

Fig. 4.

Fig. 7.

Fig. 8.

Fig. 10.

Fig. 11.

Fig. 12.

Fig. 17.

Fig. 16.

Fig. 15.

Fig. 14.

Fig. 13.

J. Mynde sc.

if even then the Diſorder is alſo advanced, and become formidable, it will be neceſſary, after the Uſe of Emollients, to apply a Kind of Boots or Inſtruments deſcribed and recommended by HILDANUS and PAREY: (See *Tab.* XXXVI. *Fig.* 14 and 15.) which being compoſed of ſtrong Leather, with thin Plates of Iron or Wood, proportioned to the Size of the Limb, its Crookedneſs may be gradually removed as it grows up, by conſtantly wearing the Machine Day and Night. But as theſe Boots are often very uneaſy and cumberſome, when badly contrived and made by the Artificer, Surgeons have therefore invented ſome Inſtruments more properly adapted to the Caſe, as in *Tab.* XXXVI. *Fig.* 16. where the Parts AA are made of Hide-leather, ſtrong Paſte-board, or thin Plates of Iron or Braſs, joined together by the flexible Leather BB, that they may be fixed upon each Side of the Leg, as in *Fig.* 17. being tied on by the Ligatures CC, and conſtantly wore Day and Night. Thus by the frequent Uſe of Emollients, and theſe two Inſtruments of HILDANUS, *Fig.* 16 and 17. the Incurvation of the Foot and Ancle may, by Degrees, by remedied. But if the Deformity is not great, I think it better to leave the whole to Nature, than to moleſt the Parts with Machines, which injure them, and ſtint their Growth. For the Parts would improve naturally of themſelves, as they grow up, better without their Aſſiſtance, as I have often obſerved, provided the Children do not ſtand or walk much, but are carried or wheeled about. For more on this Head, conſult HILDANUS *Cent.* VI. Obſ. 89 and 90. SOLINGEN *Tab.* XII. LE CLERC, *&c.*

An EXPLANATION *of the* THIRTY-SIXTH PLATE.

Fig. 1. Repreſents MEEKREN's Method of removing *Ganglia*, by beating with the Fiſt on the Tumor A.

Fig. 2. AA Shews a ſmall ſtraight Needle with a flat Point, for the Suture of Tendons in the Hand. BB a ſtrong but ſlender waxed Thread with a large Knot C at the End, intercepted by a ſquare Bit of Leather D, through which the Needle and Thread are paſſed up to the Knot.

Fig. 3. Exhibits two ſquare Bits of Leather perforated in the Middle for making the Suture of the *Tendo Achillis*, as they are repreſented in *Fig.* 7. E. F.

Fig. 4. Gives the Method of making the Suture for a Diviſion of the Tendons belonging to the Extenſors of the Figures on the Back of the Hand: *aaaa* the tranſverſe Diviſions of the Tendons; A the Manner in which the double Knot of the Thread is fixed on a Square Bit of Leather upon the upper end of the divided Tendon. B ſhews the Manner in which the double Thread is tied with a ſlip Knot over a round Compreſs, without a Bit of Leather, in the lower end of the Tendon. C ſhews the Knot of the double Thread intercepted upon the end of the Tendon by a round Compreſs inſtead of a Square piece of Leather, the other ends of the Thread D, being faſtened with a Slip-knot on a like Compreſs as before. E denotes the Method of Suture uſed by NUCKE, in which the upper end of the Tendon is perforated in two diſtinct Places *b b*, with two ſmall Needles and one Thread, the loop-end of the Thread being intercepted by a Bit of Leather, or round Compreſs E: after which the other End

of the Tendon is alſo perforated on its In-ſide in two Places by the ſame Needles, and the Ends of the Thread tied upon a Compreſs or Bit of Leather.

Fig. 5. Exhibits the Shape of a Ferula to be made of thin Wood or ſtiff Paſte-board, to extend the Fingers in a Suture of the Tendons on the Back of the Hand.

Fig. 6. Repreſents GARENGEOT's ſmall crooked Needle for the Suture of Tendons, which the Moderns think more handy than the ſtraight one, as it may be better held, and tranſmitted through the Tendon: but it has no ſharp or cutting Edges at its Point like the common crooked Needles in *Tab.* I. leſt it ſhould wound the tranſverſe Fibres of the Tendon. Its Author thinks there might be a ſharp Edge in its concave Part A: but I rather think it ſhould be on the Convexity B. The Eye of this Needle is not made Side-ways, as is common, but anſwering to its Concavity and Convexity, for the more eaſy Tranſmiſſion of the Thread. This ſmall Needle is for the leſſer Tendons, as thoſe in the Hands: but for the larger, as the *Tendo Achillis*, the Needle muſt be proportionably bigger, as at *Fig.* 9.

Fig. 7. Shews the Method of uniting the *Tendo Achillis* by Suture, as taken from KISNERI *Diſſertatio de Tendinum Læſionibus*. A the Bottom of the Calf of the Leg; B the *Os Calcis* into which this Tendon is inſerted or fixed; C the Wound or Diviſion of the Tendon: D the Knot of a ſtrong double Thread, intercepted by the ſquare Bit of Leather E; F the ſame Thread faſtened by the Slip-knot G G, upon another ſquare Piece of Leather. But the Generality of Surgeons chuſe to perforate the upper Part of the Tendon firſt, and to make the Knots upon its lower End.

Fig. 8. Exhibits a large, ſtrong, and ſtraight Needle with a flat Point, recommended by ſome for the Suture of the *Tendo Achillis*, and Tendon of the *Extenſores Tibiæ*. B B the double-waxed Thread armed with the Knot C at its Extremity.

Fig. 9. Is a large crooked Needle like that at *Fig.* 6. for the Suture of the *Tendo Achillis*.

Fig. 10. Shews Mr. COWPER's Method of making the Suture on the *Tendo Achillis*, agreeable to the Caſe which we before inſerted from him, in the *Philoſophical Tranſactions*, N° 252. A B the two Ends of the divided Tendon, perforated by the two ſtraight Needles C, D, armed with two Threads, by tying which the divided Ends AB, were conjoined; *a b* denote two Inciſions in the Integuments, to give free Acceſs to the Tendon.

Fig. 11. Is a Kind of Stocking made of Leather, or coarſe Linen, to be faſtened tight about the naked Legs by the Lace B, to be conſtantly wore for Varices and œdematous Swellings of the Legs.

Fig. 12. Repreſents a Pair of ſtrong Sciſſars for extirpating Part of the Great-toe Nail, when it runs into the Fleſh. It has one obtuſe Point A, to reſt eaſy upon the Fleſh. B B its two Handles, which are thrown open by the Spring C.

Fig. 13. Is a Pair of Nail-ſciſſars, deſcribed and recommended by GARENGEOT in his *French* Syſtem of Inſtruments. The cutting Parts A A, are concave and ſharp-pointed, and its two Handles B B are flung open by the Spring C.

Fig. 14 and 15. Exhibit the Boots of AMB. PAREY for Children, who are either *Vari*, having their Feet inflected inward, or *Valgi*, having their Feet incurvated outward.

Fig. 15. Shews the same shut by three small Hooks, as the preceding represented it open.

Fig. 16. Is another Machine for the Bandy-legged, proposed by HILDANUS, *Cent.* VI. Obs. 89 and 90. AA the two Sides made of Hide-leather, Iron-plate, or Brass, according to the Age and Strength of the Child to which they must be made sizeable. BB is a Piece of soft and flexible Leather by which the two Sides are connected; CC the two Ligatures on each Side, by which the Machine is fastened tight about the crooked Leg.

Fig. 17. Represents the preceding Instrument fastened upon the Leg, which is explained by the same Letters: but the inner Side of the Instrument can be here viewed.

INSTITUTIONS OF SURGERY.

PART the THIRD.

CHAP. I.

Of Bandages *in general.*

Uſe of Bandages.

I. THE great Uſe and Neceſſity of Bandages in relieving and curing the Diſorders of human Bodies, is very apparent, not only from their being thought worthy to be made an important Subject of Conſideration by the firſt Fathers of Phyſic, as HIPPOCRATES [a] and GALEN [b], with other eminent Phyſicians; but alſo from there being hardly any one Operation in Surgery practicable without their Aſſiſtance. Even when an Operation has been performed, in all other Reſpects, with the greateſt Judgment and Dexterity, yet if the Surgeon miſcarry in his Bandage, by an unſkilful Application thereof, all his other Endeavours, though juſt and laudable, may either totally, or in a great Meaſure prove fruitleſs, to the great Damage of his Reputation: and this more eſpecially in the Treatment of Wounds, Fractures, Luxations, Amputations, and the like. We may add, that in Fractures and Luxations, after a Reduction of the Parts, the whole Cure depends intirely on the Bandage: and, in many profuſe Hæmorrhages, nothing can afford ſo certain and ſpeedy Relief, as an exact Deligation of the Wound with a fit Compreſs and Bandage, which may even ſave the Life of the Patient, as every one knows that has the leaſt Knowledge of the Nature and Treatment of Wounds. To ſay nothing of the Recommendation, that the Neatneſs and Readineſs of making a Bandage and Dreſſing will give the Surgeon, both as to his Patient, and the Spectators, who judge of his other Abilities by his Performance of what comes under the general Cognizance of every one's Senſes,

[a] Lib. *de Officina Medici.* [b] Lib. *de Faſciis.*

as

as GALEN[a] juſtly obſerves. And therefore we ſhall think our Time well improved in making a more ſtrict and ample Expoſition of what has been hinted in general upon this Subject in our Introduction, and in conſidering the particular Make and Application of every ſingle Bandage uſed in all the Operations of Surgery.

A Bandage deſcribed.

II. A Bandage is a Piece of ſtrong Linen-cloth, of a convenient Size and Shape, ſuitable for ſome particular Part of the Body, which it is to inveſt. Sometimes Bandages are ſquare, like an Handkerchief, or a Napkin, or of other Shapes: but generally they are long and narrow, when deſigned for Wounds, Fractures, Luxations, or to retain the Dreſſings on moſt Parts of the Body. The *French* Surgeons make a Diſtinction betwixt a *Band* and a *Bandage*. The firſt is the looſe Cloth before its Application, and, by the laſt, the Band as it is fixed upon the Body.

Kinds of Bandages.

III. The Kinds of Bandages are various. Some are common to ſeveral Parts of the Body; others are *proper* to one only: ſome again are *ſimple*, and others *compound*. The ſimple Bandages are thoſe without any Slits or other Pieces joined to them. With regard to theſe, it is neceſſary to obſerve, that the Cloth of which they are formed, ſhould be cut according to the Courſe or Length of the Threads or Piece, and generally about two, three, four, or more Fingers Breadth, according to their particular Uſe, and the Size or Form of the Patient's Limb. Theſe ſimple Bandages are commonly rolled up at one or both Ends, for the more commodious Application of them to the Parts affected, and then they are denominated ſingle or double-headed Bandages or Rollers. The Figure of one with a ſingle Head may be ſeen in *Tab.* II. *Fig. b.* and a double-headed one at *Fig. c.*

Kinds of Bandages made with the ſimple Roller.

IV. There are chiefly four Ways of applying a ſimple Bandage or Roller, which are diſtinguiſhed by different Denominations. The firſt is the *circular* or annular Bandage, which is when the upper Rounds come exactly over the undermoſt. 2. The *Spiral*, when the Turns of the Roller either aſcend or deſcend upon each other in a ſpiral Form, like a Screw, termed by the *French*, *Doloires*. 3. The *Rampant*, which is, when the Turns of the Spiral aſcend or deſcend upon the Part at ſuch a Diſtance (more or leſs) as not to touch each other, leaving intermediate Spaces uncovered. 4. The *Reinverſed*, when the Declivity of the Limb, as the Leg, requires the Roller to be inverted, or half-twiſted at each Round, to make it ſet tight, ſmooth, and even.

Compound Bandages.

V. Compound Bandages are thoſe which have Slits, Apertures, or are made up of ſeveral Pieces (or ſimple Bandages) joined together by Suture; as that with four Heads, a Hole for intercepting the Chin, Noſe, *&c.* Some Figures of theſe Bandages may be ſeen in *Tab.* II. *Fig. d, e, f, g, h:* to which we may add, the Bandage with eighteen Heads, uſed in compound Fractures, repreſented in *Tab.* IX. *Fig.* 4. B B. Some of the compound Bandages are denominatd from the particular Parts to which they are applied, whether in the Head, Thorax, or Abdomen. Some take their Names from ſeveral Things which they reſemble in Figure, as the *Scapha*, *Stella*, *Stapes*, *Spica*, &c. And others a-

[a] Lib. *de Faſciis*, where he directs: *Quod injicitur, celeriter, jucunde, prompte & eleganter injiciatur.*

gain

gain are denominated from their particular Uſes, retentive, uniting, expulſive, *&c.* as may be ſeen more particularly in our following Diſcourſe.

Matter and Formation of Bandages.

VI. The Matter of which Bandages are generally compoſed at preſent, is Linen-Cloth. The neceſſary Conditions of which are, firſt, that it ſhould be *clean*, partly for Neatneſs, and partly that it may not prove offenſive to the Wound: for, as GALEN ſays, the Surgeon ought to aim at Neatneſs and Cleanlineſs, as well as Uſefulneſs in his Dreſſings. 2. That it ſhould be *ſoft:* for which Reaſon, that which has been wore ſome Time is better than quite new; which laſt would, by its Aſperity, be apt to irritate, inflame, or make the Parts itch. Yet it ought not to be wore thin, as that will make the Bandage ſubject to give way too much, or even to break. It ſhould be *ſtrong*, conſiſting of Threads, neither very coarſe, nor very fine: ſince the firſt will make the Bandage ſit uneaſy upon the Part, and the other will render it liable to break or ſtretch. 4. It ſhould have *no Hems, Knots, nor looſe Threads, nor any Seams* in it, that can be avoided: but if the great Length of the Bandage requires the laſt, they ſhould be as few and as even as poſſible, for the ſame Reaſon that it ſhould be free from Knots and Hems. 5. And, laſtly, the Length and Breadth, which every Bandage ought to have, cannot be aſcertained in the groſs, but muſt vary at the Diſcretion of the Surgeon, according to the Size or Age of the Patient, with the particular Part affected. However, that Beginners may have ſome looſe Idea in this Affair, we ſhall preſcribe a certain Length and Breadth to the ſeveral Bandages hereafter deſcribed.

Tenſion of the Bandage.

VII. It is a very neceſſary Circumſtance to be obſerved with regard to Bandages, that they be neither drawn too tight nor left too loſe, but retain a moderate Tenſion. For too great Tenſion of them will occaſion violent Pains, Echimoſis, or a livid Tumor with Inflammation, a Gangrene, and even a Mortification of the Part: whereas, on the contrary, when they are too lax, they prove of little or no Service, eſpecially in Fractures, Hæmorrhages, *&c.* You may judge whether your Bandage be over-tight, partly by endeavouring to paſs your Finger under it, and partly from the Complaint of your Patient, and Appearance of the Part affected. If the Part does not at all ſwell, nor give the leaſt Uneaſineſs to the Patient, you may conclude your Bandage to be too ſlack. But if your Patient complains of violent Pain, and you obſerve a very tenſe and livid Tumefaction of the Parts below, and no Appearance of the Veins above, you will then have Reaſon to judge your Bandage too ſtrict: as it muſt be too lax when there is no Tumor and Reſiſtance at all, ſo that you may eaſily thruſt your Finger underneath. In the Application of a Bandage with one Head to any of the Limbs, it is neceſſary to faſten it on by two or three circular Rounds one upon the other, to prevent it from ſlipping or giving way. But if the Bandage or Roller be double-headed, you are then to apply the Middle of it firſt, and then roll the two Ends of it tight about the Limb: but here the two Ends of it ſhould, for the greater Security, be twiſted together two or three Times before they are pin'd. It muſt be obſerved, that all Bandages and Compreſſes for Fractures and Luxations, ought never to be applied dry, but always moiſtened in warm Wine or Vinegar: which will not only make the Bandage adhere more firmly, but alſo at the ſame Time ſtrengthen the Part, and abate or prevent its Inflammation. Laſtly, if the Parts under

der the Bandage itch intolerably, after relaxing the Bandage a little, you may bathe them with *Oxycrate*, or wet the Parts and Bandage with Vinegar without any Relaxation, when that may be dangerous.

VIII. In removing the Bandage and Dreſſings, in order to renew them, you ſhould be very careful not to pull them off too haſtily or roughly: for the Bandage communicating with the Compreſſes and Pledgets, and theſe laſt with the Lips of the Wound and Fragments of the Bone, you might, by ſuch heedleſs Precipitation, induce a dangerous Hæmorrhage, and other bad Symptoms. And for the ſame Reaſon, when your Bandage is perceived to adhere faſt to the Skin, being glued thereto by the Blood, or Matter dried, you ought always, in that Caſe, to moiſten it firſt with Wine, or its Spirit, and then to take it off very gradually. You ought alſo to take care that your freſh Bandage, and other Dreſſings, are all prepared in Readineſs to apply to the Parts, before you take off the old; otherwiſe the Wound might be injured by being long expoſed to the cold Air. Renewal of Bandages.

IX. Though we have briefly hinted at ſome of the general Uſes of Bandages in the firſt Section of this Chapter, yet it may not be here improper to conſider ſome of their other Uſes, which are more particular. And, firſt, they are often Medicines of themſelves, being the ſole Application for the Cure of the Diſorder; as in many Fractures, Luxations, Hæmorrhages, *&c.* They are alſo as often, or more frequently, applied to retain other Medicines and Dreſſings upon the affected Parts; and are therefore ſtyled *containing* Bandages. Sometimes Bandages are uſed to reduce and prevent the Enlargement of Tumors, and then they are uſually denominated *expulſive.* The Method of applying them for this Intention in the Legs when they begin to ſwell, is to begin at the Tarſus and Ancle, and to aſcend a little with every Round, as in *Tab.* III. *Fig.* 1. F. But ſometimes theſe expulſive Bandages are not only uſed for ſwelled Legs, but alſo to diſcharge the offenſive Matter in Fiſtula and Sinuous Ulcers. 'Tis alſo a very conſiderable Uſe in Bandages, to reſtore deformed Parts to their natural Shape: and recent Wounds themſelves will very often unite without any thing more than dry Lint with a fitting Bandage, eſpecially in the fore or hinder Parts of the Head, and in the Abdomen, and then the Bandage is commonly termed *uniting:* See *Tab.* XXXVII. *Fig.* 2 and 3. As for the other moſt particular Uſes of Bandages, applied to all the ſeveral Parts and Diſorders of the Body, that will in a great Meaſure be the Subject of our Conſideration in the ſeveral ſucceeding Chapters: in which we ſhall endeavour to deſcribe, by Words and Figures, in the plaineſt Manner both to the Eye and Underſtanding, all the moſt conſiderable Bandages that are, and may be uſed upon all Occaſions in the Art of Surgery, and from whence the Reader will eaſily be inabled to invent, and contrive others for any more particular or extraordinary Caſes that may occur in his Practice. Though it muſt be indeed confeſſed, that the Doctrine of Bandages may be much more readily and exactly learned from inſpecting the Examples and Demonſtrations made by an expert Maſter, than barely from Books alone. Nor is the Counſel of GALEN to be deſpiſed, who adviſes young Surgeons to make themſelves expert and ready in this important Branch of their Profeſſion, by the frequent Application of Bandages upon a ſound Perſon: in Defect of which they may commodiouſly uſe a Statue made of Linen, and ſtuffed Uſe of Bandages.

in the Shape of a Man. The uſing of a Statue has alſo this Advantage over a living Perſon, that the Operator may maim and diſmember it at Pleaſure, to apply the ſeveral Bandages for Amputations, *&c.* which cannot be done upon the other. And, laſtly, for the Order or Method in which we ſhall conſider and deſcribe the ſeveral particular Bandages; you may obſerve, that we ſhall begin firſt with thoſe of the Head, then of the Neck, Thorax, and Abdomen, with thoſe of the upper and lower Extremities.

CHAP. II.

Of the Bandages *belonging to the* Head.

The ſimple or triangular Kerchief.

I. THAT the Ancients had a prodigious Number of Bandages for the ſeveral Diſorders of the Head, may appear from the Writings of GALEN [a], and others, on this Subject. But as they alſo appear to have greatly multiplied their Number without any Neceſſity or Advantage, the Moderns, particularly VERDUC and LE CLERC, have judiciouſly endeavoured to eaſe the Learner in this Branch, by rejecting a great many of thoſe which are obſolete and unneceſſary; yet ſo as to retain many which they deſcribe, and are really uſeful for the ſeveral chirurgical Diſorders and Operations in the Head. Among theſe, the firſt is the *ſimple, or triangular Kerchief*, termed by the *French*, *le Couvre chef en triangle*, repreſented *Tab.* XXXVII. *Fig.* 1. *a a*, *b*. This Bandage may be made of a ſquare Handkerchief, Napkin, or a ſquare Piece of Cloth folded together in Form of a Triangle, and applied with the Middle of its longeſt Side upon the Forehead, bringing its two lateral Angles cloſe round the Head, and tying them behind over the other Angle, as is often done by Men who thus apply their Handkerchief inſtead of the common Covering of their Head, when their Exerciſe is in ſultry Weather. The Application of this Bandage is exceeding eaſy, and its Uſes extremely numerous; as it may be applied, not only in Wounds, but in almoſt all other Diſorders and Dreſſings of the Head, as any one may perceive by the Figure itſelf. But if the Knot *b* proves uneaſy upon the Patient's Occiput, that Part of the Bandage may be turned round to the Forehead, and there faſtened with Pins.

The Grand Kerchief.

II. The ſecond Bandage of the Head, which is larger than the former, is termed the *Grand-Kerchief*, *(le grand Couvre-Chef)*; the Figure of which is repreſented in *Tab.* III. *Fig.* 1. A. and the Method of applying it deſcribed at Sect. LXVII. of our Introduction. 'Tis almoſt conſtantly uſed after the Operation of trepanning or boring the Cranium, and in dangerous Wounds of the Head, *&c.*

Sling with four Heads.

III. The third Bandage of the Head is a Kind of *Sling with four Heads*, *Tab.* II. *Fig. d.* formed of a Slip of Linen about an Ell long, and ſix or eight Fingers Breadth; though ſome will have it to be a Foot broad, and others make it but

[a] Conſult GALEN *de Faſciis*, as alſo GESNERUS, who are both excellent Writers on this Branch of Surgery: they deſcribe and figure ſeventy different Kinds of Bandages for the Head only.

three

three Feet in Length: and indeed we may allow of some Variation according to the Difference of Heads, and Methods of applying it. 'Tis generally used for retaining Dressings on a Wound of the Head in hot Countries and Seasons, where the two preceding, and especially the last might be too thick and cumbersome. The Band is slit up at each End, but not too near the Middle, leaving a little more than an Hand's Breadth intire. See *Tab.* II. *Fig. d.* To apply it, suppose for a Wound in the upper Part of the Head, the unslit Part of the Bandage is to be fixed upon the Compress and Dressings, and there held by the Hand of an Assistant, while the Operator carries the two posterior Heads down under the Chin, tying them in a Knot as at *Tab.* III. *Fig.* 1. If the Bandage is long enough by crossing them there, and carring them back to the Neck, where they may also be fastened by a Knot, or pin'd [a]; the two foremost Heads are then to be fastened by a Knot under the *Occiput:* or in a long Bandage, they may cross each other there like an X, and then be carried up over the Ears, and tied upon the Forehead, or under the Chin.

A second Sling with six Heads.

IV. Some Surgeons use, instead of the preceeding, *a Sling with six Heads*, about three Feet long, and one broad, sufficient to take in the whole Head. An Idea of it may be had from *Tab.* XXXVII. *Fig.* 19. supposing the two Apertures to be absent. The Middle of the Bandage being applied and held to the Vertex of the Head by an Assistant, the two middle Heads are then to be tied under the Chin, *Tab.* XXXVII. *Fig.* 2. *a a a:* the two anterior Heads are to be tied or pin'd under the *Occiput b*, and the two posterior Heads fastened upon the Forehead *c c c*, by the Knot *d*. Some will have this Bandage to be much larger, and the Application of it to be made by beginning with the posterior Heads: but these are Matters of no Consequence. As this Bandage, when it is justly applied, will stick close to the Head, and very well retain any Dressing upon that Part, when wounded, *&c.* I think we ought not to reject the Use of it. I shall here observe, once for all, that when we mention an Ell long, *&c.* you are to understand the *Paris* Ell, which is near four *English* Feet, as Merchants are well acquainted with. And this I thought necessary, to prevent Mistakes from the Variation of this Measure in different Countries.

Uniting Bandage of the Head.

V. The fourth Bandage of the Head is by Surgeons termed from its Use, the Uniting or Incarnative. It is about two Ells long and two Inches broad, having a longitudinal Fissure or Slit in its Middle, about the Length of three or four Fingers Breadth: (See *Tab.* II. *Fig. f.*) it is then rolled up at each End. The chief Use of this Bandage is to retain the Lips of a rectilinear Wound close together, whether in the Head, Eye-lids, or other Parts of the Body. See *Tab.* XXXVII. *Fig.* 3. and 4. *a a.* For the Method of applying it; after the Wound has been dressed with proper Balsams, a Plaster and two narrow Compresses, laid one on each Side, the slit Part of the Bandage *b*, is then to be fixed near the Wound in such a Manner, that one of its Ends *c*, being carried round the Head, and its Roller being passed through the Slit, both of them *d d*, are then drawn tight, so as to bring the Lips of the Wound

[a] As Bandages of the Head being fastened by a Knot in the Neck, may be uneasy to the Patient in sleeping on his Pillow, if the Ends will not reach to tie upon the Forehead, they had better be sew'd or pin'd.

cloſe together. The two Rollers in each Hand being then exchanged, and croſſed upon the Forehead, as in *Fig.* 3. and the like being done under the *Occiput* and Chin, as long as the Bandage will permit, each End of it is faſtened, as in other Bandages, either by Pins or Suture. If the Wound be too long for its Lips to be thus approximated, you may in that Caſe make another Slit in the moſt convenient Part of your Bandage, and ſo tranſmit and exchange your Rollers as before, which will promote not only the Agglutination of the Wound, but alſo the Uniformity of the *Cicatrix*. This Bandage ſhould not be taken off for ſix, eight, or more Days after its Application, when the Lips of the Wound may be ſuppoſed to have united; unleſs any urgent Symptoms ſhould require its Removal.

Bandage for Bleeding in the Forehead.

VI. The Bandage uſually applied after Bleeding in the Forehead, is about three Ells long and two Fingers Breadth. It is rolled up with but one Head, and may be applied after two different Manners: one of which is called the *Diſcrimen*, and the other the *Scapha*.

1. *Diſcrimen.*

The *Diſcrimen* is made by ſo placing the Bandage with the left Thumb upon a Compreſs covering the Wound or Puncture *a*, *Fig.* 5. as to let about a Foot of it hang down from the Forehead over the Face. After which, the Roller End of the Bandage in the right Hand is carried round the Temples and *Occiput*, 'till it comes again to the left Thumb upon the Forehead, in the circular Direction *b b*. The pendulous Part of the Bandage is then turned back upon the Forehead over the circular, coming down from the *Vertex* over the *Occiput*, in a ſtrait Direction upon the ſagittal Suture *c*, its End being faſtened upon the *Occiput*, by continuing the Roller End of the Bandage circularly about the Head as long as it will reach; faſtening its Extremity, either by Pin or Suture, upon the Part where it terminates.

2. *Scapha.*

In the *Scapha* the Bandage is carried round the Head in an oblique Circle (*Fig.* 6. *a*, *b*.) above the right Ear *b*, to the *Occiput*, and then under the left Ear, and again to the Forehead: then the pendulous Part is reflected back obliquely above the Ear on the other Side of the Head to the *Occiput*, forming a kind of Angle there, and upon the Forehead; ſo that the Parts *a*, *b*, *c*, inveſt the Head like a Boat, whence its Name. The Remainder of the Bandage is to be carried circularly round the Head, and faſtened, as before, in the *Diſcrimen*.

Bandage for Arteriotomy.

VII. The ſeventh Bandage of the Head is, from the Manner of its Application, ſometimes called *knotted*, from its many Croſſings on the Temples; and *ſtellar* or *ſolar*, from its Direction in *Radii*; making a very uſeful Bandage [a], when the temporal Artery is divided either in Arteriotomy, or by an accidental Wound, hardly ever failing of Succeſs in ſuppreſſing the Hæmorrhage. The Slip of Linen for this Bandage ought to be five or ſix Ells in Length, of two Fingers Breadth, and rolled up with two Heads. For the Application of it, after the Wound has been covered with three thick Compreſſes, each larger than the other, the Middle of the Bandage is then applied to the ſound Temple oppoſite to the Wound, (*Tab.* XXXVII. *Fig.* 7.) and bringing one Head of it round the Forehad *a*, and the other round the *Occiput b*, they then meet,

[a] And I therefore wonder it ſhould be omitted by ſeveral of our modern Writers.

and

and croſs each other upon the Part affected *c*, forming a Sort of Knot, from whence one Roller is carried under the Chin *d*, and the other over the *Vertex* of the Head *e*, both of them croſſing each other again upon the ſound Temple on the right Side. Then the two rolling Heads of the Bandage are carried round the Forehead and *Occiput*, to the Compreſſes on the Part affected *c*. And thus you are to continue 'till the Bandage is ſpent, when the two Extremities are to be faſtened by Suture.

VIII. Almoſt the ſame Kind of Bandage may be ſucceſsfully applied, with a little Variation, to ſuppreſs the Hæmorrhage after Wounds in, or an Extirpation of, the Parotid and maxillary ſalival Glands, when they are become ſcirrhous. In theſe Caſes, after the Parts have been dreſſed with Styptics, Lint, and Compreſſes, the Bandage is then fixed upon the ſound Side, as before, after Arteriotomy. (See *Fig.* 8. *a*, *b*, *c*, *d*, *e*.) But after the firſt Circumvolution all about the Head in that manner, I often repeat the Tract (*d*, *e*,) over the *Vertex*, and down under the Chin, and ſeldomer that round the Forehead and *Occiput*, than in the preceeding Bandage: and inſtead of making the Knots or Croſſings upon the Temples, as before, they are here fixed upon the Parotid, or wounded Part, under the Ear, at the Angle of the Jaw *f*. By frequently repeating them there, the Lint and Compreſſes are ſo ſtrongly preſſed upon the Part, as to prevent any Danger of a ſucceeding Hæmorrhage, always faſtening the Extremities by Suture, to prevent their getting looſe. I was obliged to contrive this Bandage when I firſt undertook the Extirpation of the forementioned ſcirrhous Glands, where I found it anſwer Expectation: nor is it without Reaſon that theſe two Bandages are called *knotted*, from their many prominent Croſſings.

After an Extirpation of the Parotids.

IX. The reflex Bandage of the Head, for an *Hydrocephalus*, termed by the *French* a *Capeline*, is about ſix Ells long, two Fingers Breadth, and rolled up with two Heads. It is applied by fixing its Middle upon the *Occiput*; and, after one or two circular Rounds, the two Rollers are then made to traverſe or decuſſate each other upon the Forehead and the *Occiput*. Then one Roller being reflected a-croſs over the *Vertex* and ſagittal Suture to the Forehead, (*Fig.* 9. *a*.) and the other carried in a Circle by the Side of the Head *b*, *e*, they both croſs each other upon the Forehead. After this, the firſt Head of the Bandage is carried obliquely towards the *Occiput c*, *d*, and is re-inverſed by the Side of the other, *a*; which laſt is continued in the circular Direction *b*, *c*, and then firſt carried from *e* to *f*, then from *g* to *h*, croſſing, while the other ſtill continues its circular Courſe. When this Reverſion has been continued till the Head is covered, and the Bandage almoſt ſpent, in order to faſten down the Reverſions of the Bandage *c d*, *e f*, *g h*, which traverſe each other obliquely, you are to finiſh by carrying one End over the ſagittal Suture *a*, and the other End in a circular Direction round the Head *b c*. Some recommend this Bandage for the Headach, as well as an *Hydrocephalus:* but of how little Service it can be of in the laſt, we may conclude from the Obſervation of Nucke *in Exper. Chirurg.* XVII.

The Capeline for an Hydrocephalus.

X. We come now to thoſe Bandages of the Head which are deſtined to the Eyes: of which there are two Kinds, termed the *Monoculus* and the *Binoculus*, according as they take in either one or both of the Eyes. The firſt of theſe

The Monoculus.

Bandages

Bandages is two Ells and a Half or three Ells long, and two or three Fingers Breadth, according to the Bulk of the Patient, and ſerves to retain the Dreſſings upon either of the Eyes, or their Lids, in their ſeveral Diſorders. For the Application of it, you place the End of the Bandage, which is rolled up with but one Head, upon the *Occiput*, and from thence carry it obliquely round the Head and Ear of the affected Side, ſo as to croſs over the Compreſs and Dreſſings upon the Eye, (*Fig.* 10. *a a*) and ſo obliquely over the Forehead *b*, down to its Beginning at the *Occiput*. When you have thus carried your Bandage thrice obliquely round, the reſt is to be ſpent in a circular Manner *c c c*, upon the Temples, *Occiput*, and Forehead, faſtening the End where it terminates. A Bandage or Sling for one Eye may be alſo very eaſily applied as repreſented at *Fig.* 11.

The Binoculus.

XI. The Bandage for inveſting both the Eyes is generally termed *Binoculus*, being about three Ells long, and as many Fingers Breadth. There are two Ways of applying it, according as it is rolled up with one or two Heads. When

1. With one Head.

it has but one Head, the End of the Bandage is firſt applied, and held upon the *Occiput*, as in the preceeding: from thence it is carried round by the left Ear *a*, (*Fig.* 12.) and Eye *b*, obliquely to the right Side of the Forehead *c*, and from thence to where it began at the *Occiput*. Then it aſcends obliquely again to the Forehead *d*, thence croſſing over the other Eye *e*, from whence it deſcends again to the *Occiput*, croſſing the former Round upon the Noſe, in the Shape of an X. Having repeated theſe two oblique or interſecting Circles thrice with your Roller, the reſt of the Bandage is to be ſpent in a plain Circle round the *Occiput*, Temples, and Forehead, in the Direction of *g g g*, faſtening the End wherever it terminates. —— 2. When this Bandage is rolled up with two Heads, then its Middle is applied to the *Occiput*, and the two Rollers carried round on each Side by the Ears, and over the Eyes, *Fig.* 12. *a*, *b*, *f*, *e*, croſſing each other like an X upon the Noſe, where the two Rollers exchange Hands and Directions, paſſing over the Temples *a*, *c*, again to the *Occiput*, where they are again croſſed and exchanged, and ſo brought round and croſſed upon the Noſe as before. Which Courſe being repeated thrice, the Remainder of the Bandage is applied in a plain circular Direction round the Head *g g g*[a]. The Application of this Bandage, when both the Eyes are affected, may be very well ſupplied by the Sling *Fig.* 11. If two are applied, one on each Eye, and their Ends tied with a Knot upon the *Occiput*, or after croſſing each other there, they may be pin'd near the Ears or Temples.

2. With two Heads.

Sling for the Noſe.

XII. There is one Bandage or Sling which very well ſupplies all Occaſions of the Noſe[b], being uſually about an Ell long and three Fingers Breadth, ſlit at each End, and rolled up with four Heads. The Slits are continued almoſt to the Middle, leaving but about two Fingers Beadth entire. Betwixt the two Slits is made a ſmall Aperture to intercept the *Apex* of the Noſe, and hold the Bandage firm. See *Fig.* 13. *a*. The chief Uſe of this Bandage is for

[a] The Method of applying theſe Bandages for the Eyes, is delivered in a very different, but much more obſcure and intricate Manner by GALEN, in his Book *de Faſciis*.

[b] The Ancients have invented and deſcribed two other Bandages, beſides this for the Noſe, one of which they call *Accipiter*, and the other the *Foſſa* of AMYNTAS. But as thoſe rather diſturb than retain the Bones of the Noſe in their proper Places, HIPPOCRATES juſtly adviſes to reject them, ſince a Plaſter only will generally ſuffice for their Support.

Fractures of the Noſe, or to retain the Dreſſings in Wounds and Inflammations of that Part, or after the Extirpation of a *Polypus*, or making a Perforation when the Noſtrils are obſtructed by ſome Membrane, *&c.* It is applied by fixing its Middle upon the *Apex* of the Noſe, and carrying its two upper Heads *b b*, backward to the Neck on each Side, where croſſing each other, they are carried up, and tied upon the Forehead *c c*, by the Knot *d:* but the lower Heads of the Bandage *e e*, are carried a little upward over the Cheeks and Temples *f*, and then croſſing upon the *Occiput*, are tied like the preceeding upon the Forehead *g g*. We ſhall conclude with this general and neceſſary Obſervation, that in all four-headed Bandages, the two uppermoſt Heads are to be carried not directly backward, but a little obliquely downward, and the two lower a little obliquely upward, croſſing each other as in this Figure, to retain the Parts more firmly.

The ſingle Bridle.

XIII. When the lower Jaw is fractured or diſlocated on either Side, the Surgeon muſt apply the Bandage termed a ſingle *Bridle (Capiſtrum ſimplex)* which is near four Ells longs, about two or three Fingers Breadth, and rolled up with one Head. It is thus applied: The Luxation being properly reduced and dreſſed, the looſe End of the Bandage is to be fixed on the *Occiput*, and faſtened there by making two Circumvolutions about that and the Forehead, *Fig.* 14. *a*, *b*. Then the remaining Part of the Bandage being made very faſt to the other, either by pinning or ſewing upon the Temple of the affected Side *b*, is carried down over the Cheek *c*, and under the Chin *d*; and from thence it is conveyed up on the ſound Side of the Head over it *Vertex e*, again to the affected Side *b*, *c*, *d*. After this Proceſs has been thrice performed, the remaining Part of the Bandage is carried from the Throat to the Neck, under the Ear, and ſo round upon the anterior Part of the Chin and lower Jaw affected, *f*, *g*; from whence again it paſſes under the Ear on the ſound Side, round the Neck, and ſo over the Chin once more. Laſtly, the remaining Part of the Bandage, if there be any, is carried from the *Occiput* to the Forehead, falling into the Circle *a b*, till it is ſpent. But you muſt obſerve that, in order to keep this Bandage tight and faſt upon the Parts, the croſſing of it *b*, *f*, upon the Temple and the lower Jaw ought to be ſewed or pin'd together. This Bandage is equally applicable as well for Fractures as Luxations of the lower Jaw.

The double Bridle.

XIV. When both Sides of the Jaw are fractured, after the Reduction you muſt apply the *double Bridle (Capiſtrum duplex)* which is a Bandage ſix Ells long, and two or three Fingers Breadth, rolled up with two Heads. The Fracture being reduced, and the Dreſſings held on by an Aſſiſtant, the Middle of the Bandage is placed under the Chin, *(Plate* XXXVI. *Fig.* 15. *a*, *b*,*)* and from thence carried up on each Side of the Jaw and Temples, the Rollers croſſing each other upon the *Vertex c*, from whence they are carried down again under the Chin as before, repeating this Courſe three Times: and after the laſt croſſing upon the *Vertex*, they muſt deſcend from thence to the Neck, where they are croſſed, and then carried on each Side, ſo as to paſs round the anterior Part of the Chin and lower Jaw *d*, *e*, and round again to the Neck. From whence, after croſſing, they proceed to the Forehead, where they form the circular Turns *b*, *f*, *f*; and then not only the Ends of the Bandage, but alſo its Croſſings upon the *Vertex* and Temples, are to be well faſtened by Pins or Su-

ture. But after all, the preceding ſimple Bridle appears no leſs ſuitable for the ſame Purpoſe than this, which is more complex.

Sling with four Heads for the Jaws.

XV. There are ſome Surgeons, who, inſtead of the Bridle, uſe a Sling or four-headed Bandage, a little above an Ell long, and of four, five, or ſix Fingers Breadth, being perforated in the Middle for intercepting the Ball of the Chin, which, though more ſimple than the former, anſwers the ſame Intention extremely well; ſee *Tab.* XXXVII. *Fig.* 16. After the Fracture or Luxation has been reduced, and the proper Dreſſings applied, the Chin is then let into the Aperture in the Bandage *a*, *Fig.* 17. *a*, and then the two upper Heads are carried back to the Neck, where the Rollers or Ends being croſſed and exchanged on the *Occiput*, are from thence conveyed to the Forehead *c c*, and there tied by the Knot *d:* but the two lower Ends of the Bandage *e* are carried upwards by the Sides of the Cheeks *f*, to the Crown of the Head, and there faſtened by the Knot *g*, or elſe carried down again, when the Bandage is long enough, and tied under the Chin.

Bandage for the Lips.

XVI. After the Operation for the Hare-lip, Wounds, *&c.* for retaining the Dreſſings, Surgeons apply a Kind of Sling with four Heads, almoſt like that for the Noſe, deſcribed in Sect. XII. but no more than an Inch broad. This Bandage is applied by fixing its Middle, which is without any Slit, upon the Lip *a*, *Fig.* 18. and then the two upper Ends *b b* are firſt carried back to the Neck, and from thence to the Forehead, upon which they are either tied by the Knot *c*, or elſe pinned: but the two lower Ends *d d* are carried a-croſs the Cheeks *e e*, to the *Occiput*, and from thence to the Forehead, where they are faſtened like the former. I know that ſome Surgeons apply the uniting Bandage *Tab.* II. *Fig. f*, of an Ell long, and a Finger's Breadth, having a longitudinal Slit in its Middle about two Fingers Breadth long, which they apply to the Hare-lip, in the ſame Manner as we directed for the uniting Bandage of the Forehead. See *Tab.* XXXVII. *Fig.* 3. But that Kind of Bandage is not only leſs convenient for this Uſe, as it compreſſes the Needles too violently, but it is, on many Accounts, even injurious and improper, as we are aſſured both from Reaſon and Experience.

The Maſk.

XVII. When the whole Face has been burnt by Gun-powder, or other Fire, we uſually form a Piece of Linen-cloth into a Kind of Maſk, with Apertures for the two Eyes, Noſe, and Mouth: which Cloth being dipped in ſome Oil, Ointment, or other Medicine for Burns, as we before directed in our Chapter on that Subject, is then commodiouſly applied to the Face, and faſtened behind the *Occiput* by ſix Tapes, or Slips of the ſame Piece of Linen. This Maſk may alſo ſerve to retain the Dreſſings for a *Phlegmon*, *Eryſipelas*, or other Diſorder of the Face.

CHAP. III.

Of Bandages *for the* Neck.

The Divider for the Neck.

I. AMONG the Bandages commonly uſed for the Neck, the firſt that deſerves our Conſideration is the *Divider*, ſo called from its dividing or

drawing back the Head, that it may not grow to the Breaſt, nor be contracted forwards, in Burns of thoſe Parts. 'Tis made of a ſlip of Linen ſix Ells long, and about two or three Fingers broad, rolled up with two Heads. The burnt Parts being dreſſed, the Middle of the Bandage is applied upon the Forehead, making two Rounds there about the Head, Plate XXXVII. *Fig.* 20. *a a*, and then one of its Rollers is carried under the right Axilla *b*, and its other under the left [a] *c*, making two Rounds about the Breaſt *d d*, to keep the Head erect: but then the Parts of the Bandage croſſing upon the Head are to be faſtened by Pins; ſee *Fig.* 21. *a*, either together, or to the Patient's Cap. This done, the two Heads of the Bandage are again carried up to the Neck, where, croſſing each other like an X, they then paſs over the Forehead, and from the Forehead they go again to the Neck, and ſo under the Arms; keeping the Head all the Time in an erect Poſture, and ſpending the Remainder of the Bandage circularly about the Forehead and Occiput. When the Bandage ſlackens, it is to be renewed again, and continued till the Parts are in no Danger of contracting. Some alſo recommend this for ſupporting the Heads of Infants, when they cannot hold them upright, through ſome Weakneſs in the extending Muſcles of the Head.

II. Another Bandage proper to the Neck, is uſually termed *Retentive*, as it ſerves to keep on the Dreſſings and topical Remedies applied to the Neck after Bleeding, Burns, or any chirurgical Operation in that Part. This Bandage is generally compoſed of two ſimple Bands, one of which is about an Ell, and the other an Ell and a half in length, the firſt being of a Thumb's breadth, and the laſt of three Fingers, to be applied in the following Manner: Firſt, the Dreſſings being applied, the ſhorteſt of the Bands is to be then laid a-croſs the Head over the Vertex, ſo as to let its two Ends hang down over the Shoulders, as in *Fig.* 22. *a a.* Then the longer Band is to be applied circularly *b b* about the Neck, and over the other Band, making it as tight as may be without obſtructing the Reſpiration: and when it is thus ſpent, faſten the End with a Pin. Laſtly, the two Ends of the firſt Band *a a* lying on the Shoulders, are to be next reflected and drawn upwards over the circular one, in the Manner denoted by *c*, faſtening them under the Ears, that the circular Bandage may not deſcend. But, to ſay Truth, this ſhorteſt Band, marked *a*, *c*, is of little or no Service; becauſe the Shoulders alone are ſufficient to prevent the circular Bandage from ſubſiding, as I have learned from Experience.

Retentive Bandage for the Neck.

III. There ſtill remains a third Bandage of the Neck, which is generally applied after the Operation of *Tracheotomy*. Which being performed, and the Cannula fixed in the Aperture made in the *Trachea*, you muſt then apply a common ſimple Bandage of about two Foot long, and two Inches broad, perforated in its Middle, and applied over a Plaſter, and Compreſs perforated in the ſame Manner: and then gently drawing the two Ends tight behind the Neck, they are to be faſtened by a Knot there. You may alſo apply for this ſame Purpoſe a Bandage of three Feet long, two Inches broad, and rolled up with one Head. Firſt, fix its End upon the Neck, and then make two circular Turns about the ſame; but when it comes to the Cannula inſerted in the *Trachea*, that Part of

Bandage for Tracheotomy.

[a] It muſt be obſerved, that a thick Compreſs ought to be placed under the Bandage at every Time bringing it under the Axilla, to prevent its fretting off the Skin.

the Bandage muſt be perforated to let the Tube through, and give a free Admiſſion to the Air to come that Way into and out of the Lungs: and the End of the Bandage, wherever it terminates, muſt be faſtened with a Pin. The Bandages are ſeldom renewed before the Patient has recovered his Reſpiration: and then the Tube being removed, and the Wound dreſſed with ſome vulnerary Balſam and a ſticking Plaſter, you are to bring its Lips together by Means of an uniting Bandage, (*Tab.* II. *Fig. f.*) which may be an Ell long, and of two Fingers breadth, applied as in other rectilinear Wounds of the Forehead, *&c.* (*Tab.* XXXVII. *Fig.* 3. *a.*)

CHAP. IV.

Of Bandages pertaining to the Thorax.

SECT. I.

Of Bandages for the Clavicle, *when it is either broke or luxated.*

The Capeline.

I. THERE are two Sorts of Bandage for the Clavicle, according as it is either broke near the Sternum or Humerus. For in the firſt ſhould be applied the *Capeline* (or *capitalis reflexa*) of ſix Ells long, three or four Fingers Breadth, and rolled up with two Heads; to be applied as we before directed in our Chapter on a Fracture of this Bone, or in the following Manner: The fractured Clavicle having been reduced and retained by proper Compreſſes and Splints of Paſteboard, (*Tab.* VIII. *Fig.* 12.) the Dreſſings are to be held on by the Hand of an Aſſiſtant, while the Surgeon applies the Middle of the Bandage to the Top of the Patient's Shoulder, *Fig.* 23. *a.* So that the Roller, on the Fore-ſide, may paſs obliquely over the *Præcordia b.* and the poſterior Roller or Head may paſs obliquely upon the Back betwixt the *Scapulæ* to the *Axilla c.* on the ſound Side; and, paſſing under the Arm, come a-croſs the Breaſt *d*, and paſſing over the anterior Roller-head, continues its Courſe round under the Arm of the affected Clavicle *e* to the Back. Then the anterior Head of the Roller is reflected back again over the affected Shoulder *f*, after it has been croſſed and ſecured by the other Head of the Roller on the Back: which laſt, being again brought towards the Thorax, is to croſs the other upon the Breaſt, before it is again returned over the Shoulder in the Direction *g*, *b.* And thus you are to continue as long as the Bandage laſts, or till the Splints, Compreſſes, and other Dreſſings are well covered, and firmly ſecured upon the fractured Clavicle. Laſtly, the Ends of the Bandage are to be faſtened, by pinning where they terminate, and the Arm muſt be ſuſpended in a Sling or Saſh about the Neck, as at *Tab.* XXXVIII. *Fig.* 17. *c c.* When the Surgeon finds it difficult to retain the Fracture by this Bandage alone from the Weight of the Arm, diſplacing the reduced Fragments, he may, in that Caſe, aſſiſt it by another Bandage, which, in a Manner, draws back and ſuſpends the Shoulders, termed the *Stellate*, from its Figure, and applied as follows.

II.

II. Take a ſingle-headed Roller, of four or five Ells long, and three Fingers breadth; fix the End of it upon a Compreſs near the Clavicle, or under the Axilla of the ſound Side: (*Fig.* 24. *a*) conduct it from thence obliquely over the ſame Shoulder, and a-croſs the Back betwixt the Scapulæ to the Top of the Shoulder of the fractured Clavicle *b*, and then under the ſame Axilla *c*; thence oliquely a-croſs the Back betwixt the Scapulæ, over the other Shoulder *d*; ſo that the Courſes may interſect or traverſe each other like an X in the Middle of the Back. And thus the whole Bandage is to be ſpent in vertical Turns about the Shoulders, and under the Arms, like an horizontal Figure of (∞). Whenever the Bandage appears ſlack, it ought to be tightened, or freſh applied about once in two or three Days; but then the Shoulder muſt be held extended by an Aſſiſtant whilſt it is off, and at other Times the Patient muſt conſtantly keep his Arm in the Sling, *Tab.* XXXVIII. *Fig.* 17. You may alſo begin to apply this Bandage by fixing its End upon the Shoulder above the Scapula *d*, inſtead of under the Axilla; and from *d* you conduct it along by *e* and *c* to *b*, thence by *e* and *a* to *d* again, and ſo on till it is ſpent. Laſtly, you may obſerve, that the Machine delineated in *Tab.* VIII. *Fig.* 13. may be ſometimes conveniently uſed for the ſame Intention as the preſent Bandage, and inſtead of it, as we have mentioned in our Chapter on the Fracture of this Bone. The Stellate Bandage.

III. When the Clavicle is fractured near the Shoulder, the moſt convenient Bandage for that Caſe is the *Simple Spica*, ſo called from its Interſections, being ſuppoſed to reſemble an Ear of Corn: it has been alſo denominated *Geranium* ever ſince the Time of HIPPOCRATES[a]. It conſiſts of a common or ſimple Band, about five Ells long, and three Finger's Breadth, rolled up with one Head. The Fracture being reduced, and the Compreſſes or Dreſſings held on by an Aſſiſtant, the End is fixed on a Compreſs under the Axilla, and the Roller is paſſed from thence to *a*, (*Tab.* XXXVII. *Fig.* 25.) obliquely a-croſs the Breaſt *b*, over the fractured Clavicle *c*; then paſſing backward upon the *Acromion Scapulæ*, it comes up again obliquely from under the Axilla *d*, ſo as to interſect, or croſs over the preceding Round at *c*, where covering the Part affected, it thence proceeds obliquely a-croſs the Back, and under the oppoſite Arm *a*. The Bandage being thrice paſſed about the Patient in this Manner, the Remainder of it may be either ſpent in the ſame Courſe, or in a circular Direction about the Arm or Shoulder of the affected Side, its End being faſtened either by a Pin or Suture. In this Caſe too the Patient's Arm muſt be ſuſpended in a Sling. And, above all, the Surgeon muſt obſerve, that the Parts are held in their juſt Poſition while he applies the Bandage, which ſhould be firm and tolerably tight: the Patient ſhould alſo keep his Arm quiet, for which End ſome faſten or bind it to their Breaſt by a circular Bandage for that Purpoſe. The Simple Spica.

Others make their Bandage of the *Simple Spica*, by beginning under the Axilla of the ſound Side, *Fig.* 25. *a*, from whence they proceed obliquely a-croſs the Back, and over the other Shoulder, taking in the fractured Clavicle itſelf *c*; and having paſſed under the Axilla *d*, it is then carried up on the Back of the Second Method of applying.

[a] See GALEN *de Faſciis*.

Shoulder, and interſecting the former at *c*, it goes obliquely a-croſs the Breaſt *b* to the oppoſite Axilla *a*, where it began. And thus they continue till the Bandage is ſpent, faſtening its End wherever it terminates. The Uſefulneſs of theſe Bandages in a Fracture or Luxation of the Clavicle is ſelf-evident: beſides which it may be alſo applied with Advantage in a Luxation of the upper Head of the *Os humeri*, and in a Fracture of its Neck.

Simple Spica with two Heads.

IV. This Bandage may be alſo applied in an another Manner, being ſomething larger than the firſt, and rolled up with two Heads. In this Method the Middle of the Bandage is fixed under the Axilla of the ſound Side, *Fig.* 25. *a*, its anterior Head paſſing obliquely over the Præcordia, and its Poſterior a-croſs the Back to the Shoulder of the affected Side *c*, where the Heads croſſing each other, are then carried down, and croſſed again under the Axilla *d*, and, riſing up, they croſs again upon the Shoulder *e*, from whence they are carried one before, and the other behind obliquely upon the Breaſt and Back down to, and under the right or ſound Axilla: where, being again croſſed, they continue the ſame Courſe as before, till the whole Bandage is ſpent, and the Clavicle well covered and ſecured. The ſame Cautions are here neceſſary, with Regard to ſuſpending the Arm in a Sling, and retaining the Parts in their due Poſition, as before.

A fourth Method of applying the Spica.

There is ſtill another Method of applying the double-headed *Spica*, by fixing the Middle of the Bandage under the Axilla of the Side affected, *Fig.* 25. *d*, then carrying up the two Heads, and croſſing them upon the Shoulder *e*; from whence, drawing them tight, they paſs a-croſs the Breaſt and Back to the right Axilla *a*, where they croſs each other, and then return again by the ſame Courſe to the Shoulder *c c*. Then being again croſſed, they paſs under the left Axilla *d*, where the Bandage firſt began. And thus the preceding Courſe muſt be repeated till the Bandage is ſpent, and the affected Parts well covered and ſecured. Some of our modern Surgeons, following Galen and the Ancients, apply Part of this Bandage like a kind of Sling or Bridle about the lower Arm, in order to ſuſtain it: but as by that Means the fractured Clavicle will be drawn downward by its ſuſtaining the Weight of the Arm, I ſhould rather approve of making a Support or Sling for the Arm to be hung about the Neck, as in *Tab.* XXXVIII. *Fig.* 17.

Gouey's Method of applying the Capeline.

V. We have yet another Method of applying the *Capeline* different from the preceding, though generally neat and commodious, deſcribed by Monſieur Gouey, in his *Chirurgie Veritable*, pag. 108. which Bandage may, in ſome Reſpects, be preferred, as being applicable when the Clavicle is fractured in any Part or Direction. His Capeline is ſix Ells long, three Fingers breadth, and rolled up with two Heads. 'Tis applied by fixing the Middle of the Bandage under the Axilla belonging to the affected Clavicle; (ſee *Tab.* XXXVII. *Fig.* 25. *d*.) and, carrying up the two Roller-heads, they croſs each other like an X upon the Top of the Shoulder, and then proceed one a-croſs the Breaſt *b*, and the other a-croſs the Back to the Axilla *a*. Here they are croſſed, and then carried circularly round the Body, and croſſed again under the Axilla of the affected Clavicle *d*, then carried up and croſſed upon the Shoulder, as before, and ſo continued till they return again to where the Bandage began. He then takes the poſterior Roller-head, and, bringing it over the Shoulder, croſſes and ſecures it upon the Breaſt by the other Head (as at *Fig.* 23. *a*, *b*.) which is ſpent circularly round

round the Body: and after the posterior Head has passed under the anterior, it is then reflected back again in the Direction *f*, and, being secured as before by the circular Turn on the Back, it then returns, and so continues till it is spent, as in Sect. I. of this Chapter. The Author of this Bandage prefers it to any other, as it retains and secures the reduced Fragments of the Clavicle in all Directions, as well downwards as laterally, towards the Sternum and Humerus. M. Gouey also judges, that this Bandage is better than the common ones for a Fracture of the Scapula.

Bandage for a luxated Clavicle.

VI. The Bandage for a Luxation of the Clavicle is almost the same as for a Fracture of that Bone: *i. e.* after it has been replaced or reduced (according to the Directions given Sect. VI. of our Chapter on a *Luxation of the Clavicle*) a Compress is to be applied dipped in *Sp. Vini*, and retained, if the Dislocation be of that End next the Sternum, by the Capeline Bandage here described at Sect. I. and V. And, if the Clavicle be pressed inward, it will be also necessary to apply the Stellate Bandage at Sect. I. to keep the Shoulders extended, and throw the Clavicle outward. But that Bandage must be omitted when the Bone is dislocated outward, when it will be rather necessary to press it inwards by a tight Bandage and thick Compresses. If that Head of the Clavicle next the Scapula be dislocated, your Bandage must then be the *Simple Spica* of Sect. III. and IV. or that of Gouey at Sect. V. preceding. And, lastly, when both of the Clavicles are violently displaced, your Business is then to apply the *double Spica*, in the Manner we shall presently direct for Fractures and Luxations of the Scapula. In the mean Time you must always observe to inculcate this necessary Caution to your Patient, that he may never violently agitate his Arm, or remove it out of the Sling, till the Parts are become firm, to prevent a Relapse of the Disorders.

SECT. II.

Of Bandages for the Humerus *and* Scapula.

Simple Spica for a Luxation of the Humerus.

VII. For a Dislocation of the Humerus, after it has been replaced, and secured from slipping out again, by fixing a Ball in the Axilla, you are then to apply the *simple Spica* described at Sect. I, III, IV, or V. preceding. The Compress here must be a Foot long and a Hand's breadth, slit up at each End, so as to form four Heads, as in *Tab.* II. *Fig.* 18. This being expressed out of warm Wine, its Spirit, or *Oxycrate*, is to be applied with its Middle upon the Ball under the Axilla, its four Heads coming up over the Shoulder or Head of the Humerus, which they are to invest. You are then to bind up the Part with the simple Spica, Sect. III, IV, or V, observing to place a Compress under the Axilla and Bandage, to prevent the Skin from being chafed. This *Spica* Bandage may be also very useful in a Fracture of the Neck or of the *Os humeri*, when the common Deligation for a Fracture of this Bone will by no Means succeed.

The double Spica.

VIII. If the *Os humeri* of each Arm are dislocated, the most effectual Bandage in that Case is the *double Spica*, as it is commonly called. When you have reduced the Bones, and secured them with a Ball or Pellet of Linen in each Axilla, with Compresses, as in our Discourse on Luxations, you then take a Band about seven or eight Ells long, and three or four Fingers breadth, rolled

up

up with two Heads, and fixing its Middle under the Axilla *d*, (*Tab.* XXXVII. *Fig.* 25.) the two Heads croſs each other upon the Shoulder *e*, and go over the Breaſt and Back to the oppoſite Axilla *a*. Here they croſs again, and then riſe up over the other Shoulder as before, from whence they go a-croſs the Breaſt and Back again to the left Axilla *d*, where they began, forming an X by traverſing each other upon the Sternum and Back, as you may ſee more expreſly in *Tab.* XXXVIII. *Fig.* 4. And thus you are to continue your Bandage, croſſing the Thorax, and about each Shoulder, till, being near ſpent, the Remainder may terminate circularly either about the Body, or one of the Arms, faſtening its Ends by Pins. This *double Spica* is not confined barely to Luxations of the *Humeri* Bones, but it may be alſo advantageouſly applied for Fractures of the Clavicles inflicted near the Shoulders, or in any other Caſes where the Shoulders themſelves require a pretty tight Deligation.

Bandages for the Scapulæ.

IX. In a Fracture of the Scapula, after the Reduction, and dreſſing with Compreſſes and Splints of Paſteboard, as in our Diſcourſe of theſe Fractures, you may then take your Choice of three Bandages. The firſt is the *double Spica* deſcribed in the preceding Paragraph. The ſecond is the *Capeline* deſcribed in Sect. I. and V. preceding. The third and laſt is the *Stellate* Bandage delivered in Sect. II. foregoing, and which is the moſt frequently uſed for theſe Fractures, obſerving that the Scapulæ and Dreſſings are retained in their due Poſition during its Application. Though it muſt be alſo acknowledged, that the *double Spica* may be uſed to Advantage, when both Scapulæ are fractured; as any one may conceive from viewing the Courſe of the Bandage, ſince it cloſely inveſts both the Shoulders and Scapulæ.

An EXPLANATION *of the* THIRTY-SEVENTH PLATE.

Fig. 1. Shews the *triangular*, or *ſimple Kerchief* for the Head, in *French*, *Couvre chef en triangle*: *a a a* the Parts of it, which inveſt the Forehead, Vertex, and Part of the *Occiput*; *b* its Corners tied upon the *Occiput*.

Fig. 2. Repreſents the Manner in which the *Grand Kerchief*, or ſix angled Bandage is applied: *a a a* its middle Corners tied under the Chin; *b* one of its anterior Corners, which, with its Fellow, is carried round the *Occiput*, and faſtened on each Side near the Ears; *c c* are the poſterior Angles brought from the *Occiput* to the Forehead, and there faſtened by the Knot *d*; *e e* the Middle of the Bandage inveſting the Head.

Fig. 3. Demonſtrates the uniting Bandage of the Forehead: *a* the longitudinal Wound; *b* the ſlit in the Bandage upon the Wound, through which its other Part *c* is paſſed; *d d* the two Heads of the Bandage, by drawing which the Lips of the Wound are approximated or conjoined, and then they terminate circularly about the Head.

Fig. 4. Denotes the ſame Bandage applied to a longitudinal Wound near the Vertex.

Fig. 5. Exhibits the *Diſcrimen*, or Depart-bandage: *a* the Part where it begins, or where its Middle is firſt applied; *b b* its circular Turns about the Head; *c* its depending Part reflected back towards the *Occiput*.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

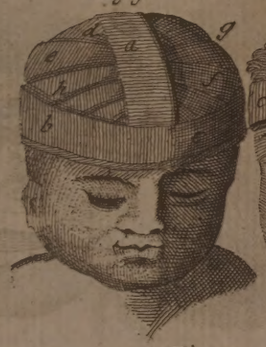

Fig. 10.

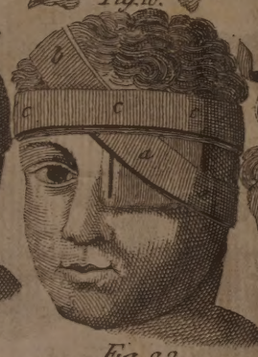

Fig. 11.

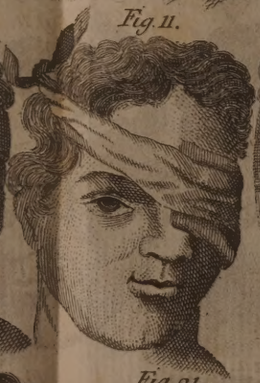

Fig. 12.

Fig. 13.

Fig. 14.

Fig. 15.

Fig. 19.

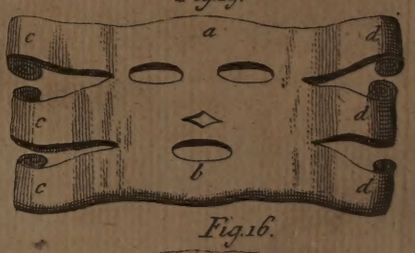

Fig. 16.

Fig. 20.

Fig. 22.

Fig. 21.

Fig. 18.

Fig. 23.

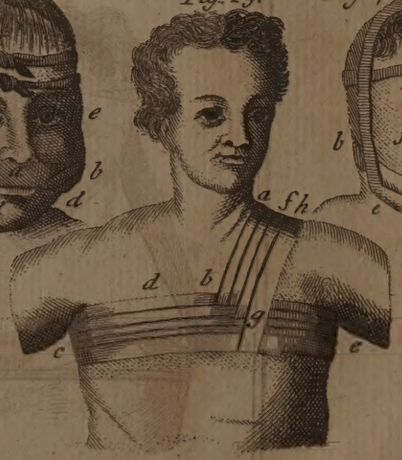

Fig. 17.

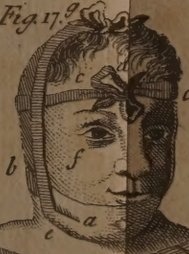

Fig. 24.

Fig. 25.

Fig. 6. Repreſents the *Scapha*, or Boat: *a* the Beginning of the Bandage; *b b* its firſt Round which is made obliquely about the Head; *c* the Beginning of the ſecond Round continued obliquely from the left Side of the *Occiput*, and meeting with the other like the Ribs of a Boat; *a d d* the circular Rounds about the Head, in which the Bandage terminates.

Fig. 7. Denotes the Knotted and Solar Bandage for Arteriotomy in the Temple: *a b* the firſt Round made by the two Roller-heads, the Middle of which being applied upon the ſound Temple, is brought round in the Direction *a b*, and croſſed upon the Compreſs on the divided Artery *c*, ſo as to form a Knot or Protuberance; after which they paſs round the Head in the oppoſite Courſe *d*, *e*, under the Chin, and over the Vertex to the ſound Temple, where they croſs again as before at *c*.

Fig. 8. *Lit. a*, *b*, *c*, *d*, *e*, denote the ſame Bandage: but with this Difference, that here the Knot *f* is made behind the parotid or ſalival Gland, here ſuppoſed to be extirpated.

Fig. 9. Shews the *Capeline* for an Hydrocephalus: *a* the depending End reflected back from the Forehead to the *Occiput*; *b c* the circular Round about the Head; *d*, *e*, *f*, *g*, *h*, the other oblique or reflex Turns which inveſt the Head.

Fig. 10. Demonſtrates the Bandage denominated *Monoculus*, for the binding up of one Eye: *a a* denote the firſt Round which paſſes from the *Occiput* round the Ear and Cheek, over the left Eye, and then over the Forehead *b* to its Beginning at the *Occiput*; *c c c* the circular Rounds about the Temples in which the Bandage terminates.

Fig. 11. Exhibits the *Monoculus* formed of a Handkerchief rolled up, and tied obliquely about the Head.

Fig. 12. Repreſents the *Binoculus* for inveſting both Eyes: applied by bringing the Bandage from the Forehead to the *Occiput* in the Direction *a b c*, over the left Eye; and croſſing on the *Occiput*, it then covers the right Eye in the Courſe *d e f*, returning to the *Occiput*, and is finally ſpent in the circular Turns *g g g* over both the Eyes.

Fig. 13. Shews the Method of applying the Sling for the Noſe: *a* the Aperture in the Middle of the Bandage which intercepts the Orbiculus of the Noſe; *b b* the two upper Heads which, being carried round the Temples and *Occiput*, are tied upon the Forehead *c c*, by the Knot *d*; *e e f f g g* denote the ſame with Reſpect to its two lower Heads.

Fig. 14. Exhibits the *ſingle Bridle*, or Harneſs for the lower Jaw: *a b* the circular Turn about the Head, by which the Bandage begins to be applied; *b* the Place where the two Rounds, interſecting each other, are ſewed together, and then paſſing under the Jaw in the Courſe *c d e*, it is turned a few Times round the Chin and *Occiput f g*.

Fig. 15. Denotes the *double Bridle*: which is made with a two-headed Roller, whoſe Middle is firſt applied under the Chin, paſſing on each Side in the Direction *a b* to the Vertex of the Head *c*; the ſame Courſe is repeated ſeveral Times, and then it is paſſed round about the Neck and Chin, ſo as to inveſt the lower Jaw, upon the Middle of which its Heads croſs at *e*, and being carried

carried to the *Occiput*, they pass from thence, and terminate circularly about the Temples and Forehead *f f b*.

Fig. 16. Exhibits the Sling with four Heads for the Chin; *a* the Foramen in its Middle, which intercepts the Chin: *b b b b* its four Heads or Ends.

Fig. 17. Represents the Manner in which the preceding Bandage is fixed upon the Chin and lower Jaw, and its Ends tied about the Head.

Fig. 18. Shews the Method of applying the Sling for the upper Lips: *a* its Middle which is not slit; *b b* its two upper Heads, which are tied upon the Forehead at *c*; *d d* its lower Heads, which, being carried up over the Cheeks *e e*, are crossed upon the *Occiput*, and then fastened by a Knot upon the Forehead.

Fig. 19. Shews the Mask for the Face: *a b* is the Mask itself which invests the Face, and is tied on by its six Heads or Ends *c c c d d d* upon the hinder Part of the Head.

Fig. 20. The dividing Bandage viewed on the fore Part of the Body: *a a* the circular Turns investing the Head, where it begins; *b, c*, the Turns which pass under the right and left Axilla to the Back, where the Roller-heads change Hands, and are then conveyed circularly about the Thorax *d d*.

Fig. 21. Represents a posterior View of the foresaid dividing Bandage: *a* the Place where the Roller heads traverse each other like an X; *b c* the Turns which go under each Axilla; *d d* the circular Rounds which invest the Thorax, and change their Courses upon the Back.

Fig. 22. Shews the contentive Bandage for Bleeding, *&c.* in the Neck. See Chap. III. Sect. II.

Fig. 23. Exhibits the *Capeline* for a Fracture or Luxation of the Clavicle, which is made with a double-headed Roller: *a b* the first Progress of its anterior Head; *c d e* the circular Rounds about the Thorax made by its posterior Head, which, riding over the former, binds it down tight before it is reflected back in the Series *f g h*. See Chap. IV. Sect. I. N° 1.

Fig. 24. Demonstrates the *Stellate Bandage* for the Clavicles and Scapulæ. It may begin under the Axilla *a*, and, forming its first Course *a b* over the left Shoulder, and under the same Axilla *c*, then traverses its said first Course at *e*, and, surpassing the right Shoulder *d*, passes again under the same Axilla at *a*, and so on as before: *e* denotes the Decussations of the Bandage, whence it has been denominated *Stellar*, from its imaginary Resemblance to the *radii* of a Star. You may also begin this Bandage above either of the Shoulders at *b* or *d*, as well as under either Axilla *a c*.

Fig. 25. Represents the *simple Spica* for injuries in or near the Shoulder and Axilla. The Middle of this Bandage is fixed under the sound Axilla *a*, and ascending cross the Breast *b* and Back to *c*, its Heads there cross, and pass under the Axilla *d* of the affected Shoulder, upon which it rises, and is crossed again at *e*; then descending a-cross the Breast and Back to the opposite Axilla *a*, it is there crossed, and the same Course repeated as before. We have before described other Methods of applying this simple Spica at Sect. III. and IV. of Chap. IV.

SECT. III.

Of the Bandages belonging to the Præcordia *and Breaſts.*

X. The Bandage to be applied after the Amputation of a Breaſt muſt be ſix, ſeven, or eight Ells long, three or four Fingers broad, and rolled up with two Heads. You firſt fix its Middle under the Axilla of the ſound Side A *Fig.* 1. *Tab.* XXXVIII. The two Heads are then croſſed upon the Shoulder at B, from whence its anterior Head deſcends obliquely a-croſs the Breaſt C, and its poſterior croſs the Back to the left Axilla D, (for we ſtill here ſuppoſe the left Breaſt amputated, or elſe only a large Scirrhus extirpated from it) where its Roller-heads are croſſed, and drawn tight upon the Compreſſes and Dreſſing on the Breaſt FE. Thence they aſcend again in the Direction C, and croſſing upon the right Shoulder B and Axilla A, then up again to B, ſo on ſeveral Times in the ſame Courſe as before; only obſerve to make your ſubſequent Croſſings of the Bandage rather upon the Dreſſings E F, than under the Axilla D, for the greater Firmneſs and Security. And, laſtly, when your Bandage is near ſpent, it muſt terminate by two or three circular Rounds about the Thorax, and upon the lower Part of the Dreſſings from A to D, faſtening its Ends where they terminate by Pins or Suture. The Bandage called *Quadriga* or *Cataphracta*, may be uſed here very properly. This you will find deſcribed in the next Section, and delineated in *Plate* XXXVIII. *Fig.* 4. The Bandage after taking off a Breaſt.

XI. To retain the Dreſſings in moſt of the common Diſorders of the Breaſts, the double T Bandage of Heliodorus (*Tab.* XXXVIII. *Fig.* 2.) is generally uſed; which conſiſts of two ſimple Bands or Slips of Linen, the one joined perpendicularly to the Center of the other in the Shape of a T, whence its Name. But its perpendicular Part is ſlit up almoſt to the End, which denominates it double, ſo that it forms a four-headed Bandage *a a* and *b b*, *Fig.* 11. or elſe two diſtinct Pieces may be ſewed on at ſome Diſtance from each other, as in *Fig.* 10. like the *Greek* Π. The tranſverſe Band *a a*, *Fig.* 10. and 11. ought to be long enough to tie round the Body, and about two or three Inches broad. The direct or perpendicular Part of the Bandage ought alſo to be long, and broad enough to retain the Dreſſings, and paſs over the Shoulders to tie behind the Back round the circular Band. The tranſverſe Part of the Bandage is applied round the Thorax at the Bottom of the Breaſts, *Fig.* 2. *a a.* ſo as to tie with a Knot upon the Back. After which the two ſlit Ends of the Bandage are carried up over the Dreſſings *c*, and on each Side of the Neck *d*, upon the two Shoulders *b b*. But there are ſome who apply the two Heads of the Bandage *b b* in a croſs Manner over the Dreſſings, to retain them the more firmly, *i. e.* the right Head of the Bandage over the left Shoulder, and the left Head over the right Shoulder: in which Method they alſo apply the Bandage at *Fig.* 11. However, we find that the plain Method at *Fig.* 2. *c.* will very well anſwer the Purpoſe of Retention, and, by paſſing the two Heads *b b* on each Side the Neck, they are prevented from ſliding to either Side off from the Shoulders: Bandage for a diſordered Breaſt.

ders: and then they may be alſo tied behind the Neck, without laying the Patient's Back naked, to faſten them to the lower Round of the Bandage; by which laſt Method a weak Patient might be greatly injured from the cold Air.

Slings for the Breaſts.

XII. Conſidering the laſt mentioned Inconvenience of Heliodorus's Bandage, and that it was but badly adapted for an ulcerated Cancer extending itſelf towards the Axilla; in the Courſe of my Practice I endeavoured to contrive a kind of Sling with four Heads, more ſuitable and commodious for the Purpoſe, which I have ſince found to anſwer the good Intentions I firſt expected from it. The Length of this Bandage or Sling I made an Ell, or four Feet long, and about ſix Inches broad, leaving the Space of about a Foot in the Middle of the Bandage unſlit or entire. The Middle or entire Part of this Bandage, *Tab.* XXXVIII. *Fig.* 3. we applied to the Compreſſes and other Dreſſings upon the affected Breaſt, which we here ſuppoſe to be the left: the two upper Heads *b b* were then carried over the right Shoulder, and the lower *c c*, under the left Axilla towards the right Scapula on the Back, where they are now tied together by two Knots a little beneath the Letter *d*. And this is the Bandage which I have found much more eaſy and commodious, both for the Surgeon and Patient, than that of Heliodorus, which laſt often moleſts the Patient to no ſmall Degree, by fretting off the Skin about the Breaſts and Thorax. Upon ſome ſlight Occaſions may be uſed a Napkin or Handkerchief applied in this Manner, which will anſwer the Purpoſe tolerably well, and with very little Trouble, in the Manner we have directed for the Eyes, *Tab.* XXXVII. *Fig.* 11.

The Napkin and Scapulary.

XIII. We come now to a Bandage, whoſe Uſe and Application is very extenſive and commodious, termed the *Napkin* and *Scapulary*. This is applicable in moſt Accidents, Diſorders, and Operations inflicted on the Thorax, as Wounds, Ulcers, Fiſtulæ, Paracenteſis, *&c.* of the Breaſt, Fractures of the *Spina dorſi*, Sternum and Ribs, or Luxations of the laſt, *&c.* 'Tis compoſed of two Pieces of Linen, the firſt like a *Napkin*, of about an Ell long for Adults; but for fat People it may extend to an Ell and a half, or more, and folded four or ſix Times together, ſo as to be about the Breadth of eight or ten Fingers, more or leſs according to particular Circumſtances: which is then to be cloſely applied round the Dreſſings upon the affected Parts, and its two Ends ſewed or pined together upon the Breaſt, when the Diſorder lies before, and upon the Back, when it is behind, as is ſhewn in *Tab.* III. *Fig.* 1. B. But to prevent this circular Band, or *Napkin*, from ſubſiding beneath the Part affected, and from off the Dreſſings, you muſt next proceed to apply the *Scapulary*, which is a Slip of Linen about three Feet long, and four or ſix Fingers breadth, with a long Slit in its Middle ſufficient to let through the Head, as in *Tab.* II. *Fig.* 9. Its two Ends come down, the one over the Breaſt, and the other upon the Back, till they reach the circular Band or *Napkin* before and behind, to which they are now faſtened by Pins or Suture, as in *Tab.* III. *Fig.* 1. B C. This laſt Part of the Bandage derives its Name *Scapulary*, from a great Part of it reſting on the *Scapulæ*, or Shoulder-blades. There are ſome, who prepare and apply this Slip of Linen for the Scapulary in a very different Manner, ſlitting it up at one End almoſt to the Middle, ſo as to make three Heads, the two anterior of which

which they place on each Side the Neck, and croſs them upon the Sternum in Shape of an X, as in *Fig.* 4. *Tab.* XXXVIII. *f.* faſtening them to the Napkin on each Side at the Thorax, as before.

SECT. IV.

Of Bandages for the Sternum *and* Ribs.

XIV. In a Fracture of the Sternum, after the Reduction and Dreſſing with a glutinous Plaſter, Compreſſes dipped in Spirit of Wine and Splints of ſtiff Paſteboard, you may, upon Occaſion, apply the Napkin and Scapulary Bandage before deſcribed. But the Generality of Surgeons make uſe of a peculiar and ſtronger Bandage for this Purpoſe, which they call the *Quadriga*, or *Cataphracta*, by which the Sternum and Thorax may be more cloſe and firmly bound up. 'Tis made with a Bandage or double-headed Roller, about ſix Ells long, and three or four Fingers breadth, applied in the following Manner: Firſt, the Middle of the Bandage is applied under either Axilla, ſuppoſe here the left, *Tab.* XXXVIII. *Fig.* 4. *a*, and its two Heads being carried upward, are croſſed upon the Shoulder *b*, from whence they deſcend, one a-croſs the Breaſt *c c*, and the other upon the Back, proceeding obliquely to the oppoſite Axilla *d*, under which being croſſed, they then riſe up, and croſs on the right Shoulder *e*, as before on the left, after which the anterior Roller-head deſcends again obliquely a-croſs the Breaſt to the left Axilla *a*, where it began. Which two Courſes being completed, the Remainder of the Bandage is ſpent in the circular Turns *g*, about the lower Part of the Thorax, deſcending a little at each Turn, and decuſſating the Roller-heads of the Bandage each Time, either in the anterior or poſterior Part of the Thorax, more firmly to inveſt the Sternum, in the Manner ſhewn by *Fig.* 21. *dd. Tab.* XXXVII. till the whole diſordered Part of the Thorax is thus inveſted. This ſame kind of Bandage may be alſo applied after the Amputation of a cancerous Breaſt: in which great Care muſt be taken, ſo to place and tighten the Bandage on the Dreſſings, as to compreſs the Veſſels, and prevent their Bleeding, which may be beſt effected by making the Roller-heads change Hands, and croſs each other upon the affected Breaſt, at every Round above the firſt. The Quadriga.

XV. With Regard to Fractures and Luxations of the *Ribs* and *Spina dorſi*, after they have been properly reduced, and ſecured by Compreſſes, dipped in warm *Sp. Vini*, and with thick Splints of Paſteboard, your Deligation may be completed as at *Sect.* XII. and XIII. preceding. Bandage for the Ribs and Spine.

CHAP. V.

Of Bandages proper to the Abdomen *and private Parts.*

I. THE moſt uſual Deligation for the Abdomen, after the Infliction of *Wounds*, or the Operations of *Gaſtroraphia*, *Paracenteſis*, &c. is, by our modern Surgeons, at preſent made with the Napkin and Scapulary, deſcribed The Napkin and Scapulary.

in Sect. XII. of the preceding Chapter, and exhibited in *Tab.* III. *Fig.* 1. BC. Which Bandage is very equal to its Intentions, only the Scapulary muſt here be longer for the Abdomen than it was for the Thorax, as every one muſt imagine from the Make of the Body.

Circular Bandage of the Abdomen.

II. The Ancients, and even at preſent ſome of the Moderns, apply a ſimple Bandage in the abovementioned Caſes of the Abdomen; which, being about ſix Ells long, four Fingers breadth, and rolled up either with one or two Heads, is then applied upon the upper Part of the Abdomen, and continued by two or three circular Turns about the ſame, after which it deſcends ſpirally, till the Parts affected and their Dreſſings are well covered and ſecured: and then ſecuring its Termination either by Pins or Suture, you are to faſten it to a Scapulary, to prevent its ſubſiding. The *Quadriga*, *Tab.* XXXVIII. *Fig.* 4. may be alſo applied with Advantage for Deligations in Diſorders of the Abdomen; with this Difference, that, after making the Turns *a*, *b*, *c*, *d*, *e*, *f*, the Courſe *g* muſt be continued either circularly, or ſpirally over the injured Parts of the Abdomen: ſo there is here no need of the Scapulary, ſince the circular Turns of the Bandage *g*, are ſuſtained by the Parts *a*, *d*.

Uniting Bandage of the Abdomen.

III. Longitudinal Wounds of the Abdomen, which are not very large, may uſually be ſucceſsfully united and healed without *Gaſtroraphia*, or the Suture, barely by the *uniting Bandage*, as we have declared in treating of Wounds in the Abdomen: which Bandage muſt be about four Ells long, and four Fingers breadth. In the Middle of it is made a Slit about four Fingers breadth long, and the Ends of the Bandage are then rolled up in two Heads, *Tab.* V. *Fig.* 8. And the Method of applying it, I think, may be eaſily learned from what we have ſaid more at large on the uniting Bandage of the Forehead, *Chap.* II. *Sect.* IV. *Tab.* XXXVII. *Fig.* 3. For, the Slit or middle Part of the Bandage being laid over the Wound, the other Head of the Roller is carried round the Abdomen, and then paſſed through the ſaid Slit, and drawing the two Heads tight, the Lips of the Wound are thereby approximated, or joined cloſe together. Then the Roller-heads, being carried back to the *Vertebræ* or Spine, are croſſed there, and brought round again to the Wound, where the two Heads decuſſate each other, to conſtringe and approximate the Lips: in which Manner the Bandage is to be continued till it is ſpent, and then faſtened either by Pins or Suture.

Bandage for the Omphalocele.

IV. For the *Hernia umbilicalis*, take a leathern Belt armed with a Compreſs either round, (as in *Tab.* XXIV. *Fig.* 6. A.) or ſquare, (as in *Tab.* XXXVIII. *Fig.* 5.) which Compreſs or Button is to be placed over the Navel, after a Reduction of the *Hernia*, and the Belt B B then faſtened round the Abdomen, either by the Buckle C. (*Tab.* XXIV. *Fig.* 6.) or otherwiſe. But leſt the Belt B B. *Tab.* XXXVIII. *Fig.* 5. ſhould ſubſide, or fall down lower than the Part affected, you muſt connect it both before and behind to the Scapulary C, made of ſtrong Linen: and to prevent it from ſliding upwards, a Piece of Linen or Callico is to be faſtened under the Compreſs A, which, being brought round the Nates on each Side the Scrotum, is carried up, and faſtened to the Sides of the Belt B B, by Strings or otherwiſe.

The T Bandage for the Scrotum, &c.

V. For *Fiſtulæ*, and Abſceſſes of the *Anus* and *Perinæum*, a Fracture of the *Os ſacrum*, a Luxation of the *Os coccyx*, after cutting for the Stone, &c. we generally apply the T Bandage of Heliodorus, as it is denominated from its Figure

Figure and Inventor. See *Tab.* II. *Fig. b.* and *Tab.* XXXVIII. *Fig.* 10. and 11. The proper Dreſſings being held upon the affected Parts, the tranſverſe End of the Bandage *a a*, *Fig.* 14. is applied round the Abdomen, with its perpendicular Part coming down upon the *Os ſacrum b*, and betwixt the Thighs *d d*, up to the circular or tranſverſe Part of the Bandage upon the Abdomen, to which tranſverſe Part they are faſtened by a Knot on each Side near the Groins. This T Bandage is alſo convenient for the *Hydrocele*, *Sarcocele*, and other Tumors of the Scrotum and Groins, with Inflammations of the Teſticles, *&c.* where, however, the tranſverſe Part of the Bandage *a a Fig.* 7, 8, 12. muſt be applied ſo, that the perpendicular Part *b b*, (*Fig.* 6, 7, 8, 9, 10, 11, 12.) may inveſt and retain the Dreſſings upon the Parts affected. In many Caſes it will be neceſſary to uſe the Scapulary without the Napkin, for the greater Firmneſs and Security of this Bandage. And, laſtly, you may obſerve, that the Figure of the T Bandage varies according to particular Uſes: That of *Fig.* 6. is adapted for the Inguen, as at *Fig.* 7. That of *Fig.* 9. is accommodated to the Scrotum, as in *Fig.* 8. That at *Fig.* 10. and 11. is fitted for Diſorder of the Breaſts, Anus, Scrotum, and Perinæum: and that at *Fig.* 13. is reſtrained chiefly to Tumors of the Scrotum, as the *Sarcocele*, *Hydrocele*, &c. being therefore termed *La Bourſe*, or Sacculus for the Scrotum.

VI. We are furniſhed with a new kind of Bandage contrived purpoſely by Monſieur ARNAUD of *Paris*, for *Fiſtulæ* and Abſceſſes of the Anus, which M. GARENGEOT [a] thinks to be admirably well adapted for thoſe Uſes, and deſcribes its Application in the following Manner: Firſt, a Scapulary (*Tab.* III. *Fig.* 1. *c.*) long enough to reach the Abdomen, is applied with the Napkin B about the Body, as we before directed in *Chap.* IV. *Sect.* XII. Then three or four Strings of Tape are ſewed near the Juncture of the Napkin and Scapulary with each other upon the Back, *i. e.* in the Interſtice *a a*, *Fig.* 14. *Tab.* XXXVIII. He then takes another Band above an Ell long, and five or ſix Fingers breadth, which he ſlits up in a right Line, ſo as to leave not above two Hands breadth entire at one End, like the Part *b* in the laſt mentioned Figure. Again, there are three or four more Strings or Tapes faſtened at the Margin of the Part *c c*, which are to tie with the other Strings of the Napkin in *a a*, by ſingle Knots: by drawing which, he ſays, the Patient may take off and renew the Bandage at pleaſure without any manner of Trouble or Uneaſineſs [b]. When the Fiſtula has been dreſſed with Tents, Lint, and Compreſſes, the fore-mentioned Strings at the Ends of the Bandage, are to be tied with each other in Knots upon the Back at *a a* and *c c*: which done, the two ſlit Ends *d d* are paſſed over the Anus betwixt the Thighs, ſo as to riſe up and join with the Napkin, the one on the right Side of the Abdomen, and the other on the left. And, laſtly, if there be a profuſe Bleeding after the Inciſion, as is ſometimes the Caſe, an Aſſiſtant is then forcibly to compreſs the Parts with his Hand for an Hour or two. The Excellency of this Bandage, according to M. GARENGEOT, conſiſts

ARNAUD's Bandage for the Anus.

[a] In his Chapter on *Abſceſſes of the Anus*; but in the ſecond Edition of his Operations he ſays nothing of its Inventor.

[b] But what is to be done with the two narrow Ends of the ſlit Bandage, M. GARENGEOT does not tell us, though without doubt they muſt be joined with the anterior Part of the Napkin, like the T Bandage, or elſe the Strings would be of no Uſe.

in

in its being held firm, and closely compressing the affected Parts by means of the Scapulary upon the Shoulders, which is the Fulcrum of the Bandage. But I also think the common T Bandage, *Fig.* 11. has the same Advantages, provided the Scapulary be made strong; and especially if the whole Bandage, or at least its transverse Part be made of Ticking for Strength.

The knotted Bandage for the Perinæum.

VII. There are few or none of the preceding Bandages capable of restraining a profuse Hæmorrhage after cutting for a Fistula of the *Anus*, or for the Stone. Nor do I find any proposed for these Purposes by Writers in their Books of Surgery and Bandages, notwithstanding the Instances of Patients lost by such profuse Bleeding after those Operations. I therefore thought it would be of some Consequence to contrive one more effectual for such Purposes, than any we are yet acquainted with, which, in my Opinion, proves to be the following. Take a Bandage or slip of Linen six, eight, or even ten Ells long, and three Fingers breadth, rolled up with two Heads. After the Wound has been dressed with Dossils of Lint, and thick Compresses dipped in *Alcohol Vini*, as in other Hæmorrhages, apply the Middle of your Roller over the Perinæum, from thence bringing up its anterior Head through the left Inguen (*a b Tab.* XXXVIII. *Fig.* 15.) a-cross the corresponding *Os ileum b*, and the posterior Roller-head ascending betwixt the Nates of the same Place, the Heads are then drawn tight, crossed or decussated, and then the anterior Head carried forward a-cross the Abdomen *d*, and the posterior directly a-cross the Back or Loins to the right *Ileum e*. Here, decussating each other again, the anterior Head is brought down over the right Inguen *f*, *g*, and the posterior descends over the right Buttock to the Perinæum, where the two Roller-heads change Hands so as to form a kind of Knot, in the same Manner as the knotted Bandage for Arteriotomy in the Temples (*Tab.* XXXVII. *Fig.* 7.) The Roller-heads being thus contorted, and drawn tight, do then again ascend, the one over the left Inguen, *a*, *b*; and the other betwixt the Nates to *c*, continuing in the same Course as before, always observing to fix your Knots or Decussations between the Thighs behind, and advancing upon the Incision of the Perinæum in cutting for the Stone, and upon the Anus after Syringotomy, or cutting the Fistula. And this is the proposed Bandage, which may be called knotted for the Perinæum, as it very closely invests and compresses that Part. If it be thought necessary to make the Bandage still stricter upon the Parts, after the first Round or Course over each Inguen, as before, and drawing the Knot tight upon the Perinæum, the anterior Roller-head may be carried up obliquely from the left Inguen *a*, over the Abdomen and right Shoulder in the Course of the dotted Line *b*, and the posterior Head being carried up a-cross the Back to the same Shoulder, the two Heads are there crossed or decussated, and then brought down again in the same Course to the Perinæum, where they are to form a Knot as before, the better to compress the bleeding Vessels. Then they are carried up in the same Manner from the right Inguen, *g*, *d*, *i*, to the left Shoulder, there decussated, brought down, and formed in a Knot on the Perinæum, as before. And, lastly, those Turns which only ascend from the Perinæum to the Hips, are to be continued circularly about the Body, as long as the Bandage lasts, for the greater Firmness and Security of the whole. But when you cross it over the Shoulders, in the last described Method, your Roller ought to be at least eight Ells long, to allow for those large Turns.

VIII. We

VIII. We have a particular Kind of Bandage, termed *Spica inguinalis*, which is applied after inteſtinal Ruptures, the Operation for the *Bubonocele incarcerata*, a Luxation of the Femur, and a Fracture of the *Os ileum*. This may be applied after ſeveral Methods like the Spica for the Shoulder before deſcribed; and, like that, it may be made either with a ſingle or double-headed Roller. The ſingle-headed Roller muſt be four Ells long, and three Fingers breadth. Its End being fixed upon the *Ileum* of the ſound Side, (*Tab.* XXXVIII. *Fig.* 16. *a*) the Roller-head is paſſed round the Bottom of the Abdomen *b b*, and from the other Hip *c*, it paſſes round the Back-part of the Thigh, comes up between the Thighs at *d*, and paſſes over the Compreſs on the Inguen *e*: and from the Hip *c*, after croſſing it goes round the Back to its Beginning at *a*; which Courſe is to be again repeated as long as the Bandage will permit, or the Surgeon ſhall ſee neceſſary. Or after the firſt Courſe has been thrice repeated, the Remainder may be ſpent circularly about the Abdomen, to bind down and ſecure the others. But after the Operation has been performed for the *Hernia incarcerata* when you have thrice repeated the firſt Courſe, you may then faſten the Bandage with a Pin in the left Inguen; and bringing it up under the Scrotum *f*, over the tight Inguen *g*, you may faſten it in the ſame Manner to the circular Rounds at *h*. Then making it deſcend again from *h* under the Scrotum *f*, it may be brought up again to the left Inguen *d e*, and there pinned as before: which Courſe may be repeated at Diſcretion, in order to retain the Dreſſings. When this Bandage is thus applied but to one Side, it is termed the *Spica inguinalis ſimplex*. Spica Inguinalis.

IX. The ſimple *Spica inguinalis* may be alſo commodiouſly applied with a two-headed Roller, about five Ells long, and three Fingers broad. The Middle of which is to be fixed, like the former, upon the right Hip *a*, *Fig.* 16. and the two Heads brought round the other Hip *c*, where, being croſſed, they are then carried down to the Perinæum *d*, where they are croſſed again, and then brought up to the Hip *c*; thence round the Body to the other Hip *a*, and ſo on till the Roller terminates. But in a Luxation of the *Os femoris*, or a Fracture of its Neck, it will be expedient to make ſome circular Courſes round the upper Part of the Femur, when the Roller is near ſpent, to ſtrengthen the Bandage and ſecure the Bones. Or you may apply this double-headed Roller, by fixing its Middle in the Perinæum at *d*; from whence bringing up the two Heads obliquely to the Hip *c*, they there croſs, and paſs round the Body to the other Hip *a*, repeating the ſame Courſe till the Bandage is ſpent, when its Extremity may be faſtened where it terminates by a Pin. Simple Spica with a two-headed Roller. Second Method. Third Method.

X. When the *Spica* Bandage is thus applied on each Side for a Diſorder in both the Groins, it is then termed the *double Spica inguinalis*, for which the Roller muſt be ſix Ells long, three Fingers broad, and rolled up with two Heads. The Middle of the Bandage is here uſually applied to the Back upon the Loins, and coming round the Body to the anterior Part of the Abdomen, the Heads are there croſſed, and, deſcending on each Side the Scrotum, they go backward and round each of the Nates to the adjacent Inguen on each Side. Then paſſing over the Inguen upon the Dreſſings, they proceed backwards and upwards to their Origin at the Loins, where the Heads being croſſed, are brought round, and deſcending over each Inguen, the preceding Courſe is repeated as before, Double Spica Inguinalis.

before, and ſo on till the Bandage being ſpent, its End is faſtened where it terminates. You may alſo obſerve, that this Bandage may be applied in the Courſe, which we deſcribed in *Sect.* VII. ſuppoſing you omit the Knots, or croſſing upon the Perinæum. And here, applying the Middle of the Bandage between the Thighs (*Tab.* XXXVIII. *Fig.* 15. *a*) the two Heads aſcend in the Direction *b*, to the Hip *c*, where, croſſing, they go round the Body to the other Hip *e*, and from thence down by *f*, *g*, under the Perinæum, where the Roller-heads change Hands, or croſs, and return in the ſame Courſe *f*, *g*, to the Hip *e*, and from thence round the Body to the other Hip *c*, and then over the left Inguen to its Origin at the Perinæum: which Courſe muſt be repeated till the Bandage is ſpent, and its End faſtened where it terminates. The *double Spica inguinalis* may be uſed for a Luxation of both the Thigh bones, or in a Fracture of their Necks, as alſo after the Operation for Ruptures on both Sides.

Bandage for Bubos.

XI. The common Bandage for Bubos, and other Tumors in the Groins, is uſually the T Bandage of Heliodorus, deſcribed at *Sect.* V. preceding; or the Bandage at *Fig.* 6. *Tab.* XXXVIII. applied like the T Bandage. But as one of its tranſverſe Heads *a a* is ſhort, it muſt be placed ſo upon the Body as to tie on one Side, as in *Fig.* 7. *c*, that the Patient may unlooſe, and faſten the ſame at pleaſure. The largeſt, and perpendicular Part *b*, deſcends over the Groin, under the Perinæum, and over the Buttock, to the Back-part of the tranſver End *a a*, upon the Loins on one Side. We have in the Table now mentioned only repreſented this Bandage for one, *viz.* the left Inguen: but the very ſame being turned on the other Side, will alſo ſerve for the right Inguen, upon which it muſt be applied as before on the left.

Bandages for the Scrotum.

XII. The Application of Bandages to the Scrotum is very frequent, not only to retain Cataplaſms, and other topical Remedies for an Inflammation, *&c.* of this Part, or of the Teſtes, but alſo for the crural Rupture, where a juſt Adminiſtration of the Bandage proves the chief Remedy. There are three Kinds of

First.

Bandage applied by Surgeons to this Part. The Firſt, and moſt handy of which is the T Bandage of Heliodorus before deſcribed at *Sect.* V. having the upper End of its perpendicular Part of about two Hands breadth, and perforated, to tranſmit the Penis, as in *Tab.* XXXVIII. *Fig.* 9. *c.* the Extremity being ſlit up for about two Spans, ſo as to make the two Heads *b b*. After the tranſverſe Part *a a* has been applied round the Body, the Penis then tranſmitted through the Aperture *c*, and the two Slips *b b* decuſſating each other upon the Perinæum, the Scrotum and its Dreſſings are, by that means, pretty cloſely inveſted and well retained, ſuppoſing the two Slips *b b* to be faſtened upon the

Second.

Hip on each Side, as at *Fig.* 8. *c*. Sometimes the Scrotum is inveſted (2.) with a kind of Sling with four Heads, about an Ell long, and ſix Fingers broad, ſlit up at each End, ſo as to leave about two Hands breadth entire in its Middle; which may be conveniently enough applied to retain Compreſſes and other Remedies to this Part. 'Tis applied by fixing its entire or middle Part upon the Scrotum, and betwixt its two anterior Heads, near the entire Part, you let through the Penis, and, carrying the Heads round the Body, tie them in a Knot upon the Loins: while the two inferior or poſterior Heads are paſſed under the Perinæum, and, croſſing each other, are brought forwards over the Na-

tes,

tes, that of the right Side to the left Inguen, and that of the left to the right Inguen, as in *Fig.* 12. tying them in a Knot. Notwithſtanding theſe mentioned Bandages are very ſufficient and convenient for moſt Dreſſings and Diſorders of the Scrotum, we are yet provided with another, which is by the *French* denominated *la Bourſe*, or the Purſe, from its Reſemblance to that Receptacle; concerning which we have already ſpoke at Sect. V. preceding. 'Tis to be made of ſtrong Linen, with four Heads, and ſuitable Strings, as in *Tab.* XXXVIII. *Fig.* 13. where AA denote the Purſe for the Scrotum; B B the two Swaths, which, being placed round the Body, are tied together by the Strings *a b*. The Aperture *c* tranſmits the Penis: and the two lower Heads of the Bandage D D are carried betwixt the Thighs, ſo as to paſs round the Nates, and be faſtened by the Strings E E upon each Hip, by paſſing them through the eylet Holes *d d*; by which Means they become duly faſtened to the upper Part of the Bandage B B. This laſt Bandage is alſo generally denominated the Suſpenſor of the Scrotum.

XIII. The ſeveral Swaths and Bandages for Ruptures, you may ſee figured and deſcribed at *Tab.* XXV. foregoing.

XIV. The little Bandage to be applied upon the Penis in Caſe of Wounds, Abſceſſes, Phlebotomy, a Phimoſis, and other Diſorders of that Part, muſt be about an Ell long, and an Inch broad; having a Slit or Aperture at one End, of an Inch long, and its other End ſlit up for about two Hands breadth. See *Tab.* II. *Fig. e.* 'Tis applied by paſſing the Slit-end through the Aperture in the other, ſo as to form a Loop or Nooſe, which is drawn tight upon the Penis and its Dreſſings: and, after winding round the Remainder of the Bandage moderately tight upon the affected Parts, till you come to the Slit-ends; theſe laſt are alſo to be paſſed once or twice round in oppoſite Directions, and then faſtened by tying in a Knot. For Abſceſſes, and other Diſorders of the *Glans* and *Præputium*, it is moſt convenient to apply a Compreſs and Plaſter, cut in the Shape of a *Malta* Croſs, making a ſmall Aperture in their Middle for emitting the Urine: theſe being ſizeable to the Part, and the other Dreſſings they are to retain, ſhould be firſt applied before the preceding Bandage, by which they are to be ſecured. And, laſtly, in Caſe of a preternatural Rigidity and Inflammation of the Penis, which often happen in a Priapiſm, Paraphimoſis, and Gonorrhea, it may not be amiſs to follow the Direction of thoſe, who adviſe the Penis to be placed in a Kind of oblong Linen-bag, anſwerable in Size and Figure to the Part, upon which it may be retained by two long Strings, faſtened about the Waiſt, or upon the Groin.

Bandage for the Penis.

CHAP. VI.

Of Bandages for the Arm *and* Hand.

I. WE have hitherto deſcribed the Bandages proper to the Trunk in its ſeveral Diſtricts of the Head, Neck, Thorax, and Abdomen. We ſhall now therefore treat of thoſe belonging to the Limbs and Extremities of the Body, whether upper or lower, beginning with that for a Fracture of the *Os Humeri*.

Bandage for a fractured *Humerus*.

Humeri. When the Fracture has been properly reduced, and ſecured with a large Compreſs (*Tab.* II. *Fig.* 18.) expreſſed out of warm Wine or *Oxycrate*, your Bandage, to be then applied, muſt be about ſix Ells long, three Fingers broad, and rolled up with one Head, which is to begin by two or three circular Rounds upon the fractured Part, and then gradually to aſcend in ſpiral Revolutions or Doloires to the Shoulder: then, after making a Courſe about the Thorax, and under the ſound Axilla (which is often omitted) the Roller returns to the affected Shoulder, and, gradually deſcending by Doloires in the like ſpiral Courſe, it at length forms three circular Rounds again upon the Fracture itſelf. Before the Roller is applied, it ſhould be moiſtened with warm Wine, its Spirit, or *Oxycrate*, in order to make it adhere the more firmly upon the Part. The Bandage at laſt deſcending to the Bottom of the Humerus in a ſpiral Courſe, it then forms two or three ſpiral Turns upon the upper Part of the Cubitus below its Flexure, but ſo as to leave the *Olecranon*, or Elbow, diſengaged, and free for Motion; by which Courſe the Bandage will adhere more firmly to the Part. This done, in the next Place, you lay four Compreſſes longitudinally, according to the Courſe of the Arm, which are to be about ſix or eight Fingers breadth long, and two broad, for Children, but three for Adults, diſpoſed upon the Fracture equi-diſtantly, and previouſly moiſtened with a little warm Wine, or *Oxycrate*. Then the remaining Part of your Bandage is carried up ſpirally over the Compreſſes from the Cubitus to the Fracture of the Humerus, where, making two or three circular Rounds, it aſcends ſpirally to the Shoulder. If any Part of the Roller ſtill remains after the Compreſſes have been well covered, it again deſcends by ſpiral, but more diſtant Turns upon the Arm, till at laſt its End is faſtened, where it terminates by a Pin. In the next Place, the Surgeon generally applies three or four Splints [a] of about a Span long, and two Fingers broad, made commonly of ſtiff Paſteboard, or Slips of thin Deal glued on Leather, but ſometimes of thin Steel or Braſs, which are applied longitudinally like the Compreſſes, according to the Length of the fractured Arm, as at *a a a*, *Fig.* 17. *Tab.* XXXVIII. Which Splints are again retained by three Tapes of about two Feet, or half an Ell long, tied firmly upon the Part, beginning with the middle one firſt, before you tie on either of thoſe at the Ends; always obſerving to make your Knots even, and upon the external Part of the Arm, for the greater Neatneſs and Conveniency of tying, and untying them. See *Tab.* XXXVIII. *Fig.* 17. *b b b.*

Treatment after the Deligation.

When the Deligation has been in this Manner compleated, the Arm is then to be ſuſpended in a Sling or Scarf about the Neck in an angular or bent Poſture, ſo that the Hand may come over the *Scrobiculum cordis* [b]. In an oblique Fracture of the Humerus it may be convenient, to let the Weight of the Arm be leſs ſupported by this Sling, in order to prevent the lower Fragment from riding over, or above the upper one: but in a tranſverſe Fracture the Sling ſhould be ſhorter. The Sling for this Uſe may be commo-

[a] There are indeed ſome (as M. Petit *Lib. de Morb. Oſſ.* Tom. II. pag. 34.) who reject the Splints as uſeleſs in Fractures, judging the Compreſſes alone to be very ſufficient, as I am ſenſible they often are. But the Generality of Surgeons have, notwithſtanding, retained the Uſe of Splints, for the greater Firmneſs and Security of the reduced Fracture.

[b] This Celsus, *Lib.* 8. has long ago taught: That a Sling is to be made about the Neck with a Napkin folded together, into which the Arm is to be placed as at *Fig.* 17.

diouſly made of a large Napkin folded together, ſo that being tied about the Neck by its two Corners in the Knot *d*, upon the ſound Shoulder, the Arm may be ſuſtained by the Middle of it *cccc*. When the Patient's Circumſtances are anſwerable, this Sling may be made of black Silk inſtead of a Napkin. Inſtead of one long Roller for the Fracture of the Humerus, there are ſome Surgeons, who uſe three ſhorter ones: of which they make the firſt an Ell and an half, the ſecond two Ells, and the third two Ells and an half long. The firſt is ſpent in aſcending Turns, the ſecond in deſcending ones, and the laſt is employed upon the Compreſſes and the Fracture itſelf: which is a Practice that will very well anſwer the End for which it is deſigned by the Operator. Some again apply the Splints immediately upon the Compreſſes, and ſpend the third Bandage, or the laſt Part of the long Roller in retaining them upon the Part; which is a Method, in my Opinion, equally good with the firſt. It is to be obſerved as a Caution, that, without ſome extraordinary Accident, you ſhould never take off the firſt or outermoſt Bandage before the fourth or fifth Day, when it is well adapted; nor the ſecond, before the eighth Day; nor the third, or innermoſt, before the twelfth Day, when the Fragments of the Bone may be ſuppoſed firmly conjoined: the firm Union of which we generally find by Experience accompliſhed in this Bone, within the Space of forty Days from its Reduction.

How to prevent an Anchyloſis.

After the third Renewal of the Bandage, the Arm is to be moved a little, or gently bent, and extended a little at the Juncture of the Elbow, in order to prevent an *Anchyloſis*, or Stiffneſs of the Joint. If the Limb ſhould have already contracted ſome Degree of this Diſorder, the beſt Method of reſtoring its Mobility is, by frequent Motion of the Joint, with the Application of emollient Ointments, Fomentations, or Cataplaſms, as alſo to let the Patient ſwing around a Weight every Day in his Hand. 'Tis alſo of no ſmall Service in this Diſorder, to thruſt and continue the Arm for ſome Time in the Belly of an Animal juſt killed. But for the Uſe of Spirits and Aſtringents in this Caſe, which are ſometimes ordered by imprudent Surgeons, they are highly pernicious.

When the Fracture is near the *Humerus*.

When the *Os humeri* is fractured in its Neck, or near the Shoulder, the Patient is then in a dangerous Caſe, and the preceding Bandage will very often be of little or no Service. It may therefore here be proper to apply the ſimple *Spica*, which we before recommended for a Fracture of the Clavicle in Chap. IV. Sect. I. preceding; only obſerving, in this Caſe, to make the Deligation, or Turns of the Bandage about the Shoulder, more exact and firm, as being the Part here immediately concerned. M. Petit alſo thinks, that the eighteen-headed Bandage, *Tab.* IX. *Fig.* 4. may be properly uſed for this Fracture. But I cannot ſee how that Bandage will be ſufficient to retain the fractured Parts.

Bandage for a fractured *Cubitus*.

II. For a Fracture of the lower Arm or *Cubitus*, after a Reduction of the Bones according to our Directions given for Fractures, you are, in the firſt Place, to apply a Piece of Linen-cloth of a Span's length and a Hand's breadth, ſlit on each Side as we deſcribed for a Fracture of the *Humerus*, *Tab.* II. *Fig.* 18. which, being dipt in *Sp. Vini*, or *Oxycrate*, its Heads, or ſlit Parts, are to be cloſely applied round the Fracture. Then you are to take two thick Compreſſes, almoſt the Length of the *Ulna*, and apply one on the Inſide, and the other

on the Outside of the Cubitus, over which again you must fix Splints of Wood or Pasteboard of a convenient Size: though M. PETIT thinks the Use of Splints unnecessary here. For your Bandage, that must be a single-headed Roller of about an Ell and half long, and three Fingers broad, which is to invest the Splints, or Compresses without the Splints, first, by making two or three circular Rounds upon the Fracture, and then ascending by spiral Doloires or Turns above the Cubitus and Elbow, where two or three circular Rounds must be made before the Band terminates. Then you take another Band, and, fastening it by two or three circular Turns upon Termination of the former, it then gradually descends by spiral Turns to the Hand, and, taking in the Thumb by it as in a Loop, you draw it back, or extend it towards the Carpus, upon which, after two or three circular Turns, its End is fastened by a Pin. Then you are to place two Splints of thick Pasteboard, the one without, and the other within-side the Cubitus, which Splints must be almost as long as the *Ulna*, and broad enough to invest the Part, dipping them first in Spirit of Wine, or *Oxycrate*, to render them pliable, and to sit close to the Limb, upon which they are to be retained by a Bandage two Ells long, and near three Fingers broad, to be applied first by making two or three circular Rounds about the Middle of the Cubitus, and then ascending spirally to the Elbow; then descending in the same Manner, the End is to be fastened where it terminates by a Pin or Suture. Yet there is no great Obstacle against your retaining the Splints by three or four Tapes, as we have represented in *Tab.* XXXVIII. *Fig.* 17. *b b b* for the *Humerus*. And there are some Surgeons, who use but one Pasteboard Splint, in which they place the Arm as in a Trough. See the Figure of it in *Tab.* VIII. *Fig.* 14. The Method of applying it is in *Tab.* XXXVIII. *Fig.* 17. *e e.* When every thing has been adapted in this Manner, the Arm is to be constantly suspended in a Napkin or Sling about the Neck, denoted by *c c c c* in the last cited Figure. For the rest, you may observe what has been said at Sect. II. *& seq.* for a Fracture of the Humerus. And thus a Fracture of the Cubitus, or lower Arm, will usually obtain a perfect Cure within the Space of a Month or thirty Days.

Bandage for a Fracture of the Carpus.

III. For a Fracture of any of the Bones in the Carpus, after the Fragments have been adequately reduced, the following Bandage is to be applied. First, you take a single-headed Roller five or six Ells long, and two Fingers broad, with which you make three circular Rounds about the injured Carpus, passing it soon after betwixt the Thumb and Fore-finger, and then roll it thrice round the Carpus again, so as to make the Bandage intersect itself upon the Back of the Hand like an X. This done, the Roller-head is then carried up spirally from the Carpus towards the Cubitus, and at last passes above the Juncture of the Elbow: then, after fixing a Compress on the out and inside of the Carpus corresponding to its Breadth, the Bandage descends again spirally to the Hand, in order to make an exact Retention of the Compresses. Lastly, over the Compresses are placed two Pasteboard Splints, which are bound on very exactly by the Remainder of the Bandage: and the Arm is then suspended in a Sling or Napkin about the Neck, as at *Fig.* 17.

Bandage for the Metacarpus.

IV. When the fractured Parts of any of the metacarpal Bones have been adequately reduced, the Bandage, before ordered for the Carpus, is to be applied by making, first, three circular Rounds above the injured Part of the Hand: and

and then, passing it betwixt the Thumb and Fore-finger round the Ball of the former, it is carried round the Carpus, after which it returns to its former Course about the Metacarpus, by crossing over the Back of the Hand like an X. When this Course has been thrice repeated, and the Bandage carried a few Times round the Metacarpus, it then gradually ascends by spiral Turns above the Cubitus, or Elbow, as we said before at Sect. III. And, lastly, two Compresses and Pasteboard Splints are placed, the one on the Palm, and the other on the Back of the Hand, in which Position they are closely retained by the Remainder of the Bandage. See the Figure of the Splint in *Tab.* XXXVI. *Fig.* 5.

Bandage for a Luxation of the Cubitus.

V. For a Dislocation of the Cubitus, after an adequate Reduction, as we have directed in our Book of Luxations, a Linen-cloth cut, as in *Tab.* II. *Fig.* 18. is to be first dipt in *Sp. Vini*, or *Oxycrate*, and then exactly applied round the Elbow, or Juncture of the Cubitus. You then take a single-headed Roller about five Ells long, and two Fingers broad, with which you make two circular Rounds above the Flexure of the Cubit, from thence descending obliquely a-cross its Flexure, as in the Bandage after Bleeding. It then forms two circular Rounds upon the Cubit below the Elbow: and, ascending again obliquely over the Flexure, and up by the Inside of the Arm, it, by that Means, crosses the former Course in shape of an X; and, having made two more circular Rounds about the lower Head of the Humerus, it is then carried down below the Elbow. This Bandage therefore forms a sort of Figure of 8, the one half above, and the other half below the Elbow. There are indeed some Surgeons, who think this long and complicated Bandage unnecessary for a Luxation of the Elbow, as the Intention may be as effectually answered by a simple spiral Bandage continued up and down the Arm; moistening the Roller with some of the forementioned Liquors, to suppress or prevent a Tumor and Inflammation of the Parts. And, lastly, the Arm, being thus dressed, is to be suspended by a Sling about the Neck, as before: but then Care should be now and then taken gently to bend and extend the Arm, to prevent a Stiffness of the Joint.

Bandage for a Luxation of the Carpus.

VI. For a Luxation of the Carpus, after Extension and Reduction, you take the preceding Bandage; and, passing it thrice round the affected Part, it is then carried betwixt the Thumb and Fore-finger, going backward round the Ball of the Thumb, and crossing the former Turn on the Back of the Hand like an X, and then it passes circularly about the Carpus. This Course, being several Times repeated, you are then to bind a stiff Pasteboard Splint on the fore and back Part of the Carpus, and a large Ball is to be placed in the Hand, in order to extend the Fingers: all which are to be properly secured by the rest of the Bandage, which is at last to terminate by spiral Turns above the Cubitus, to prevent Tumor and Inflammation.

Bandage for Bleeding in the Arms.

VII. Among other Bandages of the Arm, we shall here briefly describe that for compressing the Orifice of an incised Vein, after bleeding in this Part. This is to be about an Ell, or Ell and half long, and near two Fingers broad; and is, in my Opinion, best applied by fixing its End upon the square Compress, covering the Orifice so as to let about a Span of it hang down above the Outside of the Flexure of the Cubitus. Then carrying the other Part of your Bandage from the Compress obliquely down, and over the Innerside of the Arm, and making

a Round below the Flexure of the Elbow, it aſcends again obliquely from the Outſide over the Compreſs, and round above the Elbow like a Figure of 8, the X or croſſing, coming in the Middle of the Flexure of the Arm. This laſt Courſe of the Figure of 8 you are to repeat as long as the Bandage will permit, ſaving enough to tie with the other End in a Knot above the Elbow on the Outſide of the Cubitus, as in *Tab.* III. *Fig.* 1. D. If little Strings of a Span long are faſtened to each End of this Bandage, as we frequently do in *Germany*, it may then be very neatly applied, as thoſe Strings make but a very ſmall Knot: and then the broad Part of the Bandage need not exceed an Ell in Length, and its Application may be performed exactly in the ſame Manner.

Bandage for a Puncture of the Artery in Bleeding.

VIII. If the Surgeon ſhould either, by Accident or Imprudence, having inciſed the Artery in opening the Vein of the Arm, after letting the Patient bleed *ad deliquium*; (ſee Part II. Sect. I. Chap. XII.) he muſt apply two or three thick Compreſſes, in one of which muſt be included a Farthing or Half-penny, to make the greater Preſſure and Reſiſtance upon the wounded Artery. Then you muſt take a ſingle-headed Roller, five or ſix Ells long, and two Fingers broad, and making firſt two or three Rounds above the Elbow, you then conduct the Roller as after Phlebotomy at Sect. VII. but drawing the Bandage a little tighter here for the Artery, than for the Vein. After five or ſix Rounds about the Arm and Elbow in that Manner like a Figure of 8, apply a long and narrow Compreſs, extending on the Inſide of the Arm from the Flexure of the Cubitus to the Axilla, ſo as to be incumbent as exactly as poſſible upon the Brachial Artery. Your Roller muſt then aſcend gradually by pretty tight ſpiral Rounds upon the Arm up to the Top of the Shoulder, in order to ſtop and diminiſh the Quantity of Blood coming to the Wound by that Trunk of the Artery. Which done, your Roller then is carried obliquely from that Shoulder a-croſs the Breaſt, and under the oppoſite Axilla, and, coming round again to the Shoulder of the injured Arm, it then deſcends ſpirally upon the Arm in an oppoſite Courſe to the preceding, faſtening the End of your Roller ſecurely wherever it terminates. If a Bandage of the forementioned Length is not at hand, any one that you have, which is ſhorter, may be faſtened about the Wound, and the brachial Artery, which may even be held and compreſſed by the Fingers of an Aſſiſtant, till you can procure a longer Bandage: for to delay any conſiderable Time in providing a longer Bandage without this Precaution, would expoſe the Patient to a dangerous Hæmorrhage, and more fatal Symptoms. For nothing can hinder you from applying your long Bandage over the ſhorter, with the neceſſary Compreſſes, as we have now directed, when you have them in Readineſs. When the Deligation is compleated, the Arm is to be ſuſpended in a Sling about the Neck, as in *Tab.* XXXVIII. *Fig.* 17. but without the Paſteboard Caſe *e e*. In the mean Time the Patient muſt be ordered to abſtain from Commotions both of Body and Mind, and alſo to refrain from an heating Diet, and ſpirituous or fermented Liquors: and for the reſt, you may conſult our Chapter profeſſedly on the Accident before-cited.

Bandage for an Aneuriſm.

IX. Nor is the preceding Bandage confined to Punctures of the Artery only but it may be alſo applied with equal Advantage for ſmall Aneuriſms, which do not require the Operation with a Scalpel and Tourniquet. In which Caſe the

the firſt Step is to return the extravaſated Blood again into the Artery, by Preſſure with the Finger or Thumb: after which you muſt apply over the Part that was diſtended, firſt, a bit of aſtringent Plaſter, and then a thick Compreſs with a bit of Money folded in it, as in the preceding; which Plaſter and Compreſs muſt be ſizeable to the Aneuriſm, or Tumor. Over the firſt Compreſs, including the Money, you are to apply ſeveral others, according as the Caſe may require, and retain the whole, by cloſely adapting the Bandage deſcribed in the preceding Paragraph, which Dreſſing is to be conſtantly wore for a conſiderable Time upon the Part. See an Example or two deſcribed by HILDANUS, *Cent.* III. *Obſ.* 43, 44. But if this Bandage ſhould prove inſufficient, I refer you to the Method deſcribed Part II. Chap. XIII. and Plate XI. *Fig.* 8 and 9.

Bandage for Phlebotomy in the Hand.

X. After bleeding, or opening a Vein in the Hand, particularly in the *Salvatella*, as 'tis commonly called, you fix two ſmall Compreſſes on the Orifice, and, with a broad Piece of Tape upwards of an Ell long, you make two circular Rounds about the Carpus; thence guiding it over the back of the Hand, it paſſes betwixt the Ring and little Finger, then back again betwixt the firſt and middle Finger to the other Side of the Carpus, croſſing the former like an X upon the Compreſs and Back of the Hand. This Courſe round the Ring-finger and Carpus, being thrice repated, the Bandage terminates by as many circular Rounds about the laſt, upon which its End is faſtened.

Bandage for a burnt Hand.

XI. After the Uſe of Medicines proper for Burns or Scalds, you then take a Piece of Tape ſix Ells long, and an Inch broad, rolled up with one Head. With this you make two circular Rounds about the Carpus, from whence it is carried a-croſs the Palm of the Hand to the little Finger (*Tab.* XXXVIII. *Fig.* 18. *a.*) which is the firſt inveſted therewith by ſpiral aſcending, and then deſcending Turns down to its Root at the Hand, from whence it paſſes to the Ring-finger *b*, which it inveſts, in the ſame Manner, then to the middle Finger *c*, and the Index *d*, from the Bottom of which laſt it paſſes by the circular Turns *e e e*, about the Metacarpus betwixt the Thumb and Fore-finger: then it inveſts the Thumb, *f*, in like Manner as did the Fingers, and from the Bottom of the Thumb it is carried on ſpirally upon the Remainder of the Metacarpus by the Rounds *g g*, the Fillet itſelf terminating at laſt circularly as it began, upon the Carpus. This Bandage, as it covers the Hand like a Glove, takes its Name from thence, and is called by the *French*, *le Gantelet*. It is of great Service in preventing the Fingers growing to each other, or to the Hand itſelf.

Bandage for a Fracture of the Thumb.

XII. A Fracture of the Thumb-bones, being adequately reduced by our former Directions for that Purpoſe, does then require a ſingle-headed Roller, or Tape near two Ells long and an Inch broad, which you faſten on by two circular Rounds about the Carpus; and then proceeding to the fractured Part, you inveſt it by three circular Rounds, and placing two Splints of thick Paſteboard on the Back and Inſide of the Thumb about a Finger's Breadth, you then make three more circular Rounds upon the ſame. And, laſtly, returning your Bandage to the Carpus, after making two or three Turns, it is there terminated and faſtened. When both Internodes of the Thumb are fractured, you then alſo apply the ſame Bandage with very little Variation, only repeating the Rounds upon each fractured Part ſeparately, and extending the Splints over both the Joints.

XIII. For

Bandage for a fractured Finger.

XIII. For a Fracture of the Finger you are to apply the preceding Bandage in the foreſaid Manner upon the fractured Part; only you muſt afterwards bind the fractured to the next ſound Finger, as a Support for it, till the Fragments are firmly united.

Bandage for ſeveral Fingers fractured.

XIV. When more than one of the Fingers are fractured, after an adequate Reduction, you take a Bandage three Ells long, and two Fingers broad, and, making two circular Rounds about the Carpus, you carry it from thence over the Back of the Hand to the affected Fingers, binding it round about all of them, ſo as to leave no Part uncovered. Then the Palm of the Hand is to be expanded upon a Piece of Paſteboard, *Tab.* XXXVI. *Fig.* 5. and to be ſecured in that Poſition by the Bandage. Though there are ſome, who think it better to retain the Fingers a little inflected, by graſping a large Ball, inſtead of the flat Splint, upon which firſt they are alſo to be ſecured by a Ligature or Bandage, as upon the Splints. And upon which ſoever of theſe you ſuſtain the Fingers, the Bandage is at laſt to paſs from the Fingers to the Carpus, upon which it muſt be faſtened, and the Hand afterwards ſupported conſtantly by a Sling about the Neck.

Bandage for luxated Fingers.

XV. Luxations of the Fingers are generally ſo eaſy to cure barely by Extenſion, that there is ſeldom any Occaſion for Bandage; except the Diſorder has been long neglected, and the Joint appears extremely weak. Then you may apply a Band an Ell and half long, and a Finger broad, much in the Manner we directed for them when fractured, making firſt two circular Rounds about the Carpus: from thence you carry it over the Back of the Hand to the luxated Finger, binding it round the affected Joint, and, croſſing it over the ſaid Joint in a crucial Manner, paſs it round the Carpus again: which Courſe, being thrice repeated, it terminates, and is faſtened upon the Carpus. If more than one of the Fingers are luxated, they are each of them to bound up in this Manner ſeparately: which kind of Bandage is uſually termed by the *French*, *Le demi Gantelet*, or the half Glove, as inveſting the Hand only without the Fingers.

Bandage for an amputated Finger.

XVI. When the End of a Finger has been either by Accident cut off, or deſignedly amputated on account of a Mortification, or a Caries of the Bone, after the uſual Remedies laid upon the Wound, you apply the ſame Bandage and Dreſſings, which we before directed for the Penis. Firſt ſome ſcraped Lint, then a Plaſter and Compreſs in Form of a *Malta* Croſs, *Tab.* II. *Fig. e*, and laſtly a Fillet of a Foot long, and a Finger's Breadth, (*Tab.* II. *Litt. e.*) is to be cloſely and neatly applied round the Finger.

Bandage for an Amputation of the Hand, or Cubitus.

XVII. After an Amputation of the Hand or Cubitus, firſt apply the Remedies, Lint, and Compreſſes, as we before directed in Sect. VIII. of our Chapter on the Operation. You then take a double-headed Roller about five or ſix Ells long, and three Fingers broad, and fixing about a Hand's Breadth of its Middle above the amputated Place *c*, *Tab.* XXXVIII. *Fig.* 19. you make three or four circular and tight Rounds, to ſecure whatever Dreſſings *a* are laid on the Stump. Then either of the Roller-heads is carried from *c*, over the Stump *d*, and, aſcending up on the other Side, it is traverſed by the other Head, which binds it down, and keeps moving round the Limb. Then the former Roller-head is reflected back a little obliquely over the Stump again to where it came from, and ſo on in the Manner we directed in making the Capeline for the Head and Clavicle:

Clavicle: which Courſe is to be repeated till the Stump and its Dreſſings are well covered. Then the ſhorter End of the Bandage is to be faſtened down by the ſpiral Turns of the longer Head, by turning the firſt upward and downward, and the Extremity of the laſt muſt be well ſecured by Suture. You muſt obſerve to make this Bandage pretty tight, to retain the Dreſſings more firmly upon the Part, and to prevent the divided Veſſels from bleeding, by compreſſing them. When your Deligation is compleated, the Patient muſt be put to Bed, and the amputated Limb raiſed upon a Pillow: and, to ſtop its bleeding the ſooner and more effectually, an Aſſiſtant ſhould compreſs the Parts with his Hands, till the Patient is out of Danger. The Bandage muſt not be looſened till the third Day, unleſs any thing particular require it; and then with great Caution and Gentleneſs. When the Patient is able to riſe, the Stump muſt be reſted in a Sling, hung round the Neck, till the Wound is quite healed.

Bandage for an amputated Arm.

XVIII. When the Arm is taken off above the Cubitus, or Elbow, having tied up the divided Arteries, and applied the uſual Dreſſings, the Deligation muſt be performed almoſt in the ſame Manner with that in the laſt Paragraph; only your Roller muſt here be longer, about ſix Ells, and applied over a long and thick Compreſs, laid on the brachial Artery within-ſide the Arm, and extending from the Amputation to the Axilla. But when the Arm is amputated near the Shoulder, the remaining Stump being not longer than three or four Fingers Breadth; after taking up the larger Blood-veſſels with Needle and Thread, it will be neceſſary to apply a double-headed Roller that is eight Ells long, and three Fingers broad, in ſuch Manner that the Roller-head, which in the laſt Caſe made the Reflexions or Croſſes over the End of the Stump, may here paſs round the Thorax, under the ſound Axilla: and this being brought round again to the Stump, you muſt therewith cloſely inveſt the ſame. For, without that Round about the Thorax, the reſt of the Bandage will eaſily ſlip off from the End of the Limb. But if there is little or no Stump left behind, it will then be convenient to make your Deligation in the Manner we ſhall direct for an Amputation of the Arm in its Articulation with the Scapula in the ſubſequent Paragraph.

Bandage for an Amputation in the Shoulder.

XIX. In Caſe of amputating the Arm in the very Articulation of it with the Scapula, after treating the Wound as we before directed, (in Part II. Sect. I. Chap. XXXVII. Sect. VIII.) your Deligation muſt be compleated in the following Manner: Take a ſingle-headed Roller ten or twelve Ells long, and four Fingers broad, the End of which is to be fixed under the ſound Axilla, and there held by an Aſſiſtant. Then conduct the Roller-head a-croſs the Breaſt to the amputated Shoulder, which it paſſes over, and returns croſs the Back again to the ſound Axilla. Which Courſe is again repeated, and the Roller is carried from under the ſound Axilla, over the ſame Shoulder behind the Neck, and paſſing over the Amputation, it goes again over the Breaſt to the ſound Axilla; and, paſſing round the ſame Shoulder, it now returns over the Breaſt, and croſſes the former Turn like an X. This laſt Courſe being ſeveral Times repeated, the Remainder of the Bandage is ſpent circularly round the Thorax and amputated Part, to ſecure the Dreſſings, and confirm the whole Deligation: which being finiſhed, the End of the Bandage muſt be ſecurely faſtened, where it terminates, by Suture.

CHAP. VII.

Of Bandages for the Leg *and* Thigh.

Bandage for a Fracture of the Femur.

I. IN deſcribing the Bandages for the lower Extremities, we ſhall firſt conſider thoſe which are proper to the Thigh, and then treat of thoſe belonging to the Leg and Foot. And among the firſt, we ſhall begin with that for a Fracture of the Thigh-bone, which Bandage muſt be differently applied, according to the particular Circumſtances of the Fracture, as it happens either in the Neck, lower, middle, or upper Part of the Femur. Different Artifices are alſo to be made in applying the Bandage, according as the Fracture is either oblique, or tranſverſe, or below the Neck of the Femur. For, when the Fracture is below the Neck of the Femur, either in its middle, or towards the Knee, after the Reduction, *&c.* as in our Diſcourſe on Fractures, you are then to apply three Bandages, two of which are to be four, and the other three Ells long, and each about three or four Fingers broad, all of them rolled up with ſingle Heads. But before the Rollers are applied, you muſt dip a ſingle piece of Linen (ſlit with four Heads as in *Tab.* II. *Fig.* 18.) in warm Wine, its Spirit, or *Oxycrate*, which is to be laid round the fractured Part of the Thigh, ſo that the Heads go over, or a-croſs each other. Then a long and thick Compreſs is to be extended upon the Femur, according to the Length of the Thigh, in order to fill up the natural Excavation in the poſterior Part of the Bone; leſt, without this, the Bandage might too much ſtraiten and elongate the Bone. This done, the Thigh is now to be taken hold of, above and below the Fracture, by two Aſſiſtants, who are to lift it up, while the Surgeon firſt applies the ſhorteſt Roller, beginning with three tight circular Rounds on the Part fractured, and as we before directed for the Arm in Chap. VI. Sect. I. Then the Roller aſcends gradually by ſpiral Rounds towards the Inguen, where it terminates by two or three circular Rounds, and is then faſtened. You next take one of the four Ell-rollers, and making two or three circular Rounds, where the preceding began, but, in a contrary Direction, and folding the Compreſs together, (*Compreſſe graduée*, as the *French* term it) in the Manner of *Tab.* IX. *Fig.* 1. you deſcend by ſpiral Rounds down to the Knee, below which it terminates by two or three circular Rounds, and its End is then faſtened. You muſt ſtrictly obſerve to make the Rounds of your Bandage much tighter, when the Fracture is oblique, than when it is tranſverſe. In the next Place, you apply four Compreſſes of about a Span in Length, and three Fingers Breadth, and over them four Splints of the ſame Length and Breadth, for retaining the Fragments of the Bone; though inſtead of four narrow Splints, you may conveniently apply two large ones, as M. Petit adviſes. About the Splints you are to faſten the third and laſt Roller of four Ells long, beginning by two or three circular Rounds in their Middle over the fractured Part, from thence aſcending by ſpiral Turns upward, and then deſcending in the ſame Manner, till the Splints are well covered, and the End faſtened where it terminates, by Pin or Suture. Laſtly, the whole Thigh is to be ſuſtained by two other Splints of thin Deal, or ſtiff Paſteboard, dipped in warm

warm Wine, or *Oxycrate*; which are to be tied on by three or four Tapes, in the ſame Manner as we directed for the Arms in Chap. VI. Sect. I. *Tab.* XXXVIII. *Fig.* 17. *aaa*, *bbb*.

The Deligation being in that Manner compleated, the next Buſineſs is for the Surgeon to place the Thigh in the moſt convenient Poſture, for which we uſe a kind of Mattreſs, or Straw-bed, furniſhed with two cylindrical Sticks covered with Straw, as in *Tab.* IX. *Fig.* 5. But here the two Sticks or Junks muſt not be both of the ſame Length, as they are for a Fracture of the Leg, or *Tibia*, for which this (*Fig.* 5.) is adapted. For that going within-ſide the Leg and Thigh, ſhould be juſt long enough to reach from the internal Ancle to the Inguen. But the external one ſhould reach from the Hip, or ſuperior Part of the *Os ileum* to the external Ancle, or, as ſome will have it, be long enough to reach from the ſaid Ancle, all along the Side of the Body to the Axilla. For if theſe Supporters are not long enough, eſpecially in an oblique Fracture of the Thigh, there is great Danger of its contracting and becoming ſhorter than the other, which will neceſſarily ſubject the Patient to halt in his Gait. However, M. PETIT will not have the external one reach any higher than the upper Part of the Hip, which will prove always ſufficient, provided the reſt of the Deligation be tight. The Limb being thus carefully extended, ſo that the Great-toe may lie in a Line parallel with the Patella, or a little more outward, the Spaces about the Ancle and Ham are then exactly filled up with Lint or Tow. After this there are ſome Surgeons who inveſt the whole Leg and Thigh with large Compreſſes, which others think unneceſſary, to guard againſt any Injury from the external Ligatures, ſeven of which will be generally ſufficient to faſten the ſaid Straw-caſe about the whole Leg and Thigh, each about a Yard long, and tied three about the Leg (as in *Fig.* 20.) three about the Thigh, and the laſt, or ſeventh, which muſt be longer than the reſt, about the lower Part of the Abdomen. But ſome prefer the Application of a Napkin about the Abdomen, inſtead of the laſt Ligature. With regard to which Ligatures you muſt always obſerve, not only to place them under the Straw-caſe before the Limb is put into it, to avoid any Agitation thereof on this Occaſion; but alſo to begin your tying of them with the middle one firſt, going on to each End, and making your Knots on the Outſide of the Thigh, both for Neatneſs and Conveniency. At the Bottom of the Foot is to be placed the Sole of a Slipper, or a Piece of Paſteboard cut into a proper Shape, as in *Tab.* IX. *Fig.* 6, 7. which is tied on by the three Strings *aaa*, ſo that thoſe two on the Sides may croſs each other about the Knee or Ancle like an X (*Tab.* XXXVIII. *Fig.* 20. *e*, *f*.) pinning them to the Bandage: but the third, marked *g*, may be faſtened to the moſt convenient Part of the Straw-caſe. And thus the Limb may be retained in the moſt commodious and natural Poſture, that when the Cure is compleated, the Patient may not be incapable of ſtanding upon his Leg, as hath been ſometimes the Caſe. But to prevent the Foot-board from preſſing too forcibly, and from being uneaſy, you may interpoſe a ſoft Compreſs betwixt that and the Foot, as in *Tab.* IX. *Fig.* 7. In like Manner, you may alſo place a Sling of Linen under the Heel (*Fig.* 8. *a*.) to be tied round the Tarſus by the String *bb*, in order to prevent an Inflammation of the firſt, from the Preſſure of the Calcaneum ſo long a Time againſt the Bed. But if that Contrivance does not free the Calcaneum from Uneaſineſs,

Poſition of the Thigh after Deligation.

eaſineſs, and the lower End of the *Tendo Achillis* be injured by the Preſſure of the ſaid Sling; it may, in that Caſe, be convenient to ſew the two Heads of a broad Roller together at an Inch Diſtance from each other, as in *Tab.* XXXVIII. *Fig.* 21. The two Heads *a a* being fixed into the Excavation near the Ancle above the Calcaneum, will intercept the *Tendo Achillis*, and ſupport the whole. Laſtly, if this too ſhould prove uneaſy, which does ſometimes happen, you may interpoſe ſome ſoft Lint betwixt them. In the next Place the Leg and Thigh are to be fixed in the Middle of a ſoft Pillow, which ſhould lie higher under the Leg than Thigh; and which Pillow ſome Surgeons faſten to a ſmooth Staff extending from the Hip to the Calcaneum, to retain the whole Limb in its rectilinear Poſture: and, to prevent the ſame from moving to either Side, Ligatures are faſtened to the middle String on the Leg, and to Nails drove on each Side of the Bedſtead, and then a Pair of Sheets are to be rolled up, and laid one on each Side the Limb. All which are equally neceſſary to be obſerved, as well for Fractures of the Leg, as of the Thigh. Laſtly, Some apply a kind of Arch, made of ſmall Hoops figured by SCULTETUS in *Tab.* LVI. *Armament. Chirurg. Edit. in* 4^to^, *An.* 1666. or the one Half of a Drum or deep Sieve may be uſed inſtead thereof, to keep off the Bedcloths from preſſing, ſo as to render the Limb uneaſy. For the reſt, you may conſult what we have ſaid in the Chapter on the Fracture of the *Femur*, in the Part of our Surgery.

Bandage for an oblique Fracture of the Femur.

II. In an oblique Fracture of the Thigh, it will not only be neceſſary to make the Bandage ſtricter, but alſo to be more ſollicitous to keep the Limb duly extended. For this Purpoſe you ought therefore to obſerve what has been ſaid at Sect. VIII. of our Chapter on this Fracture, with what follows. Betwixt the Thighs you muſt place a large Linen-cloth folded together, ſo that it paſs over the Inguen of the affected, and under the Buttock of the ſound Thigh, the Ends of which Cloth are to be nailed on each Side of the Bedſtead, to keep the Patient's Body from deſcending. Then another Ligature muſt be made above the Knee upon the Thigh affected, which muſt again be faſtened to the Bottom of the Bedſtead, to prevent the Limb from contracting upward. If theſe Ligatures or Stays ſhould in Time prove uneaſy, you muſt change their Places, the upper one paſſing now under the Buttock of the affected Thigh, and up over the Inguen of the ſound; and the lower one taken off from the Knee, and applied to the Ancle, and ſo alternately, till the Callus of the Fracture is firm enough to reſiſt the Contraction of the Muſcles, which would otherwiſe render that Thigh ſhorter than the other. The Surgeon will alſo do well to let the Patient have a little Block covered with Linen, at the Bed's Feet againſt his ſound Foot, that thereby he may raiſe himſelf, and extend the other, when he finds his Body has deſcended. Which Precautions are alſo neceſſary to make an exact Cure of tranſverſe Fractures of the Femur, though more eſpecially for the oblique.

Method of renewing the Bandage.

When the Bandage has been well applied, and nothing extraordinary forbids, it ſhould not be taken off, and renewed before the eighth or tenth Day. But if the outermoſt Bandage appears too tight or lax, or ſome other Cauſe ſhould make it neceſſary to renew the ſame, it muſt be taken off, and re-applied with great Caution: nor ought the ſecond and third Roller to be taken off before the End

End of the Fortnight. And the laſt ſhould continue on till the Cure is compleated, which is ſeldom accompliſhed in the Fragments of this very large Bone, before the ſixth Week after the Reduction of the Fracture: which will even require eight, nine, or ten Weeks for a Cure, in Patients of a bad Habit, or far advanced in Years. And though the Callus may ſeem ſufficiently firm, and the Cure compleat, at the Expiration of that Time, yet the Patient ought not to walk for a conſiderable Time afterwards without Sticks, and even Crutches at the Beginning: elſe he will be in Danger of relapſing into a ſecond Fracture of the lately reduced Bone.

Bandage for a Fracture in the Neck of the Femur.

III. For a Fracture in the Neck of the Thigh-bone, you muſt apply the Bandage, which we before deſcribed in Chap. V. Sect. VIII. under the Denomination of *Spica Inguinalis*; the Form of which we have repreſented in *Tab.* XXXVIII. *Fig.* 16. But here your Roller muſt be four or five Ells long, and three or four Fingers broad, which muſt be very ſtrictly applied, and the Limb kept well extended downward; or elſe the Contraction of the femoral Muſcles is ſo ſtrong, that the lower Part of the Bone will be drawn above the upper, ſo that its Neck cannot unite with its Head: conſequently that Leg will be ſhorter than the other, and the Patient muſt halt. Towards the End of your Roller it muſt terminate by circular Rounds about the Thigh, and be faſtened by Pins or Suture. The Limb is then to be fixed in a Straw-caſe, as before, and the Patient ordered to lie very ſtill in his Bed. For the reſt, you muſt obſerve what has been ſaid in the two preceding Paragraphs.

Bandage for a Diſlocation of the Femur.

IV. The *Femur* is nothing near ſo eaſily or frequently luxated by external Violence, as is commonly imagined; but it may be ſo more frequently from internal Cauſes, mentioned in our profeſſed Chapter on this Subject. But as, when the Head of the *Femur* is thruſt out of its Socket, and its Ligaments debilitated by a Collection of viſcid Humours, or a ſcrophulous State of its mucous Glands, thoſe Humours are very difficult to diſperſe or remove, 'tis no wonder that Patients thus afflicted are ſcarce ever cured, without halting afterwards. However, to afford all the Aſſiſtance we are able, a Compreſs dipt in warm Wine, or *Oxycrate*, muſt be firſt laid round the Juncture of the Thigh, and then ſecured by the *Spica inguinalis* Bandage before deſcribed in Chap. V. Sect. VIII. and repreſented in *Tab.* XXXVIII. *Fig.* 16. And, laſtly, the Patient muſt reſt in his Bed for a Month: when it proceeds from ſome Diſorder or Diſtortion of the Ligament, you ought every Day to repeat often Fomentations *ex Sp. Vini Rect. Sp. Matricali, roriſmarini, Lavendulæ*, &c. with the Uſe of Baths and proper ſtrengthening Plaſters.

Bandage for a perpendicular Fracture of the Patella.

V. We have elſewhere obſerved, that the Patella may be fractured either in a perpendicular or tranſverſe Direction. The moſt convenient Deligation for the firſt, will be, after Reduction, and defending the Tendons in the Ham by a thick Compreſs, to apply the uniting Bandage, *Tab.* II. *Fig.* 1. of about three Ells long, and two or three Fingers broad, ſlit in its middle longitudinally for about three Fingers broad, and rolled up with two Heads. 'Tis applied much in the ſame Manner with that for longitudinal Wounds in the Forehead, Chap. II. Sect. V. *Tab.* XXXVII. *Fig.* 3. That is, the Middle of the Slit being laid on the Patella, one of the Roller-heads is carried round the Ham, and paſſed through the ſaid Slit, and by drawing the two Roller-heads tight in each Hand

Hand, the Bandage by that Means closely and adequately inveſts the Articulation and fractured Patella, whoſe two Sides are thus retained close to each other. Then each Head of the Roller is carried above and below the Knee as long as the Bandage will permit, till its End terminates, and is faſtened in the ſame Courſe: but in the mean Time you ſearch with your Fingers, to know if the fractured Parts of the Patella are adequately replaced and conjoined. Being thus far advanced, you now impoſe a Compreſs on the Patella, and fix a ſtiff Paſteboard Splint in the Ham, both which are to be previouſly dipped in warm Wine, and retained by a Bandage of two or three Ells long, to be ſpent round the Part in a ſpiral Courſe: which laſt Part of the Dreſſing is to keep the Knee duly and equally extended, till the fractured Parts are conjoined by an uniform Callus. Laſtly, you apply the Straw-caſe, *Tab.* IX. *Fig.* 5. by tying it on the Leg with three or four Tapes, as in *Tab.* XXXVIII. *Fig.* 20.

Bandages for a tranſverſe Fracture of the Patella.

VI. When the Patella is fractured in a tranſverſe Direction, as it is much more frequently than in the perpendicular one, after the Extenſion of the Limb, and Approximation of its fractured Parts, with the uſual Dreſſings of a Plaſter, *&c.* as in our Diſcourſe on this Fracture; you then take a Bandage of three Ells long, and as many Fingers broad, which may be applied in a two-fold Manner, according as it is rolled up, either with but one or with two Heads. The firſt, or double headed Roller, is applied immediately above the Knee, by making a circular Round *d* about the Thigh, above the ſuperior half of the Patella *a*, *Tab.* XXXVIII. *Fig.* 22. Then the Roller-heads, croſſing at the Ham, are brought obliquely forward below the Knee, in the Round *e*. They are then carried back again, and the ſame Courſe repeated above and below the Patella, as long as the Roller laſts; obſerving, in the mean Time, to keep the fractured Parts adequately together in their due Poſition.

1ſt Method.

2d Method.

The ſecond Method of applying this Bandage is, by rolling it up with a ſingle Head, and fixing its End immediately above the reduced Fragments of the Patella, at the Knee, marked *a*. You firſt make ſeveral circular Rounds about the Thigh *b*, to be faſtened on the End of the Bandage, from whence you carry the Roller-head obliquely behind the Ham, to the upper Part of the Leg below the Knee, where you make the circular Round *e*, cloſe to the inferior Half of the Patella, thence taking it obliquely a-croſs the Ham, traverſing the former, you go round the Bottom of the Thigh *d*, thence again deſcending below the Knee like a Figure of 8. Which Courſe is to be repeated till the Bandage is ſpent. In the next Place, you muſt here alſo obſerve to keep the fractured Parts adequately together during the Deligation. When that is finiſhed, you muſt apply a Compreſs, dipt in warm Wine, or *Oxycrate*, to the Patella, and a Splint to the Ham, which are to be ſecured by a ſeparate and ſpiral Bandage as before, that the Knee may not have the leaſt Motion, which would be here highly injurious. There are ſome Surgeons, who apply a peculiar Inſtrument to keep the Leg extended, and from moving; for which conſult our Chapter on this Fracture, in the firſt Part of our *Surgery*. Which Inſtrument is frequently attended with the deſired Effect. Laſtly, you may apply the Straw-caſe upon the Leg, as in *Tab.* XXXVIII. *Fig.* 20. in order to compleat your Retention thereof. But as it will be impoſſible to avoid ſome Stiffneſs of the Joint, by keeping the Limb thus extended without the leaſt Inflection, for ſo long as nine or ten Weeks, the

Patient

Patient will conſequently halt more or leſs with that Leg. This you muſt endeavour to mitigate and remove, by the frequent Application of emollient Topicals, as Ointments, Fomentations, *&c.* giving the Joint an ample and frequent Motion afterwards. We ſhall conclude with the common Obſervation, that they who have once fractured this Bone, will, from the Weakneſs and Stiffneſs of the Joint thereby induced, be continually ſubject to ſtumble, or halt more or leſs, and will therefore hardly eſcape breaking the other Patella, or the ſame at another Time.

A third Bandage for a Fracture of the Patella.

VII. As it is ſo difficult to retain the Fragments together in a tranſverſe Fracture of the Patella, Surgeons have therefore invented another kind of Bandage, which they make of a Piece of Linen, about two Feet long, and thrice folded together, ſo as to be eight Inches broad. Out of this, *Tab.* XXXVIII. *Fig.* 23. they cut a Piece C D, about two Inches broad from the End B B, leaving the End A entire. The Part C, which is thus evacuated, to adapt it to the Patella, is then applied above the Knee as betwixt *d*, and *b*, *Fig.* 22. ſo that the Excavation may inveſt the Patella. In the next Place, they apply the ſingle-headed Roller preceding by three Rounds about the Thigh, over the Cloth or Compreſs, in the Courſe of *d*, *Fig.* 22. over theſe Rounds they reflect the entire End of the ſaid Cloth, and then repeat the Round at *d* thrice more, to bind down and ſecure the ſame. Then they take the two Ends of the ſaid Cloth (*Fig.* 23. BB) on each Side of the Patella, and order an Aſſiſtant to draw them down tight, that the ſuperior Half of the Patella may be brought to the inferior: then the Roller, croſſing over the Ham, forms three circular Rounds *e*, *Fig.* 22. below the Knee or Patella, upon the two Ends of the Cloth, and the two Ends of the ſaid Cloth are next turned back over the firſt Rounds. Laſtly, the Roller again paſſes thrice about them circularly, to ſecure them firmly, the Remainder of the Bandage being ſpent in Turns above and below the Patella, and its End is faſtened by Pin or Suture where it terminates. You may alſo uſe the double-headed Roller for this Purpoſe, as well as the ſingle one now mentioned. You muſt diſpoſe the Limb for reſt in the Manner before preſcribed.

Bandage for a Diſlocation of the Knee.

VIII. We cannot deſcribe a more convenient Bandage for a Luxation of the Knee, than thoſe before ordered for the Patella; eſpecially that for the tranſverſe Fracture of the Patella. The Parient ought to keep his Bed and Chair at leaſt eight Days before he walks, that the Ligaments may recover their Tone, and become ſufficiently firm.

Bandage for a Fracture of the Tibia.

IX. For the Deligation of the Tibia after its Fragments are reduced, two Bandages are required, the one five, and the other three Ells long, each being three Fingers broad. To theſe add four Compreſſes, and as many Splints, each a Span long, with the reſt of the *Apparatus* deſcribed at the Beginning of this Chapter, Sect. I. for a Fracture of the Thigh. Your Deligation is performed firſt, by inveſting the fractured Part with a Piece of Linen ſlit as in *Tab.* II. *Fig.* 18. and dipped in Spirit of Wine, or *Oxycrate*, diſpoſing its Heads on the Fracture, ſo as to decuſſate, or croſs each other. Then three circular Rounds are made with the firſt Bandage over the Cloth upon the Fracture, and aſcending ſpirally about the Tibia, it at Length goes round above the Knee, and then deſcends ſpirally on the Tibia, upon which, by Reaſon of the Inequality above and below the Middle of the Calf, it may be proper to re-inverſe the Roller, as

we

we have directed for the re-inverſed Bandage. You now apply the Compreſſes and Splints to the Leg, as we before directed for a Fracture of the Arm: but the Compreſſes muſt here be folded together towards their Bottom, to fill up the Inequality of the Leg near the Ancle, that the Tibia may be every where equally conſtringed. See *Tab.* IX. *Fig* 13. Laſtly, you apply two Paſteboard Splints, dipped in warm Wine, or *Oxycrate*, and tied on by three or four Tapes: then you ſupport the Leg with the Straw-caſe or Junks, *Tab.* IX. *Fig.* 5. and *Tab.* XXXVIII. *Fig.* 20. which muſt be long enough to extend not much lower than the Ancles, and not above a Hand's Breadth beyond the Knee, tied on by three or four Strings, *a*, *b*, *c*, *d*, and the Spaces filled up with Tow or Lint. And, laſtly, a Foot-board with its Sling for the Heel, *Tab.* IX. *Fig.* 6, 7. 8. muſt be fixed to the Bottom of the Foot, as repreſented in *Tab.* XXXVIII. *Fig.* 20. C.

Bandage for a Fracture of the Tarſus and Metatarſus.

X. The Deligation for a Fracture of the Tarſus and Metatarſus, after Reduction, may be made either with a ſingle or double-headed Roller, three Ells long, and two or three Fingers broad. That with two Heads is applied firſt over the upper Part of the Compreſs, and round the Ancle, as in *Tab.* XXXVIII. *Fig.* 24. A; then, croſſing like an X over the Juncture of the Foot, the Roller-heads are carried down round the Tarſus and Metatarſus, and, croſſing again under the Sole of the Foot, they riſe up, and croſs upon the Inſtep, or Metatarſus, and, going round the Angles, are there faſtened, after two or three circular Turns.

The ſingle-headed Roller.

The Roller with a ſingle Head is faſtened on by two or three Rounds about the Ancle, from whence deſcending obliquely over the Inſtep under the Bottom of the Foot; and from thence riſing up, it goes over its former Courſe on the Inſtep, or Tarſus, like an X, and ſo round the Ancles, ſo that it reſembles a Figure of 8 about the Foot and Ancle. The Remainder is ſpent circularly round the affected Part of the Tarſus, where its End is faſtened. In very bad Fractures of this Part, the Foot ſhould be placed in a Straw-caſe with a Foot-board, *Fig.* 20. This Species of Bandage may be uſed for Fractures of the Toes, if you inveſt them ſpirally, as directed before for the burnt Hand and Fingers, and then tie on a Foot-board or Paſteboard Splint like a Sandal, as they are figured to have been wore by the Ancients.

Bandage for a Luxation of the Foot.

XI. For a Luxation of the Tarſus or Ancle, after reducing and treating it, as we have directed in our Chapter on that Subject, your Deligation may be performed in the ſame Manner as we have but now preſcribed for a Fracture of the Tarſus: The Patient ſhould, in this Accident, keep his Bed and Chair for a few Days, and, in the mean Time, often bathe the Part with ſome ſtrengthening Spirit, till the Ligaments become robuſt, and the Pains vaniſh.

Bandage for Phlebotomy in the Foot.

XII. That the young Surgeon may not be ignorant how to apply the Bandage after Bleeding in the Foot; he muſt know, that it is made with a ſingle-headed Roller an Ell and a half long, and two Fingers broad, the End of which is laid over the Compreſs, and there held with his left Thumb, ſo as to let about a Span of it hang down on the Outſide of the Foot, as in the Deligation for Phlebotomy in the Arm. Then conducting the Roller obliquely over the Tarſus, and round under the Foot, and over the Compreſs two or three Times circularly like a Stirrup, it then goes obliquely from over the Tarſus round the

the Ancle, and from thence again obliquely over the Compreſs, down under, and round the Foot, and then again about the Ancle. Which Courſe being repeated till the Bandage is almoſt ſpent, you tie the two Ends together upon the Outſide of the Foot; as in *Tab.* III. *Fig.* 1. E. Some begin this Bandage by two or three circular Rounds about the Ancle, then paſs obliquely over the Tarſus and Compreſs, under the Foot; and ſo up, and a-croſs the former Turn, like an X, and then again round the Ancle, as in *Tab.* XXXVIII. *Fig.* 24. A. B. faſtening the laſt End either by Pin or Suture. There are yet other leſs conſiderable Methods of making the Deligation after Phlebotomy in the Foot: but as in all of them there is ſome Reſemblance of a Stirrup, the Bandage is therefore uſually denominated the *Stapes*.

Bandage for Phlebotomy in the Sura.

XIII. When you bleed in the Sura, which I judge the ſafeſt of any in the lower Extremity; your Bandage ſhould be a ſingle-headed Roller, two Ells in length, and two Fingers breadth. The firſt End of it ſhould hang down about a Span on the upper Part of the Sura and the Inſide of the Tibia. From hence the Roller is conducted over the Compreſſes on the Wound (which are to be held with the left Thumb) obliquely downward to the lower and inward Part of the Sura, where it paſſes round the Tibia, and from its Outſide aſcends again oliquely to its Inſide at the Ham: under which, it runs again round the Tibia, and returns to its Beginning. It then repeats its firſt Courſe, making ſome Folds round the Sura in Form of the Figure 8. And, laſtly, the two Ends are tied together in a Knot under the Ham.

Bandage after an Amputation of the Leg or Thigh.

XIV. For an Amputation of the Leg, or Thigh, after the proper Dreſſings are applied, your Deligation is compleated in the Manner we preſcribed for an Amputation of the Arm, *viz.* by the *Capeline*, or reflexed Bandage, deſcribed in Chap. VI. Sect. XX. *Tab.* XXXVIII. *Fig.* 19. only the Leg and Thigh require the Roller to be longer than that of the Arm.

CHAP. VIII.

Of the Deligation for a compound Fracture of the Leg.

Bandage for a Fracture of the Tibia with a Wound.

I. FOR a compound [a] Fracture of the Leg, after reducing the Fragments, cleanſing the Wound, and the Impoſition of proper Remedies or Dreſſings, we then apply a Bandage peculiarly adapted to the Caſe, furniſhed with eighteen Heads, or Leaves, like a kind of Book, (as in *Tab.* IX. *Fig.* 4. B B.) and therefore the *Germans* call it the *Book-band*. This is extremely well adapted for a compound Fracture, as it may be open or bound up, and the Dreſſings renewed without moving the Limb: whereas thoſe uſed in ſimple Fractures would diſtort the Fragments, and prove very inconvenient and hurtful. We ſhall therefore be very explicit in our Account of the Deligation with this Bandage.

[a] The Ancients uſed the very ſame Bandage for compound, as for ſimple Fractures, as we learn from Celsus Lib. VIII. Cap. X. N. 7.

Previous Diſpoſition of the Bandage.

II. Suppoſing your Fracture of the Tibia to be accompanied with an external Wound of the Integuments, as repreſented in *Tab.* IX. *Fig.* 4. A. after your Reduction of the Fragments, cleanſing of the Wound, and dreſſing with ſcraped Lint, and proper Medicines, you then take the Straw-caſe, or Bed, *Tab.* IX. *Fig.* 5. AA, BB, having three or four Pieces of Tape, each a Yard long, placed under it; over which Caſe you again lay three other ſuch Ligatures in a tranſverſe Direction, and upon them the eighteen-headed Bandage, with its Leaves expanded, as in *Fig.* 4. BB. and in *Tab.* XXXVIII. *Fig.* 25. CC, DD, EE. Along the Middle of the Bandage is to be laid a Compreſs of the ſame Length, and a Hand's Breadth. And thus you have the whole ready for receiving the Leg.

Its Application.

III. Your next Buſineſs is to place the Bandage and *Apparatus* under the fractured Leg, whilſt it is held up in a convenient Poſture by an Aſſiſtant; (ſee *Tab.* IX. *Fig.* 4. *Tab.* XXXVIII. *Fig.* 25.) and then to apply the two middle Leaves dipped in Spirit of Wine, or *Oxycrate*, next the Leg, a-croſs each other over the Dreſſings upon the Wound, and round the Tibia. Then you proceed to apply the two lower Leaves, and then the two upper, all of the firſt Order, exactly a-croſs each other, not quite even and circularly, but a little obliquely, in the Manner of CCC, DDD *Tab.* XXXVIII. *Fig.* 25. This done, you muſt next apply the Leaves of the next ſucceeding Order in like Manner with the former, beginning with the middle ones, and ending with the uppermoſt, and drawing them cloſe round the Leg, as in *Fig.* 25.

Application of the Splints and Compreſſes.

IV. When your eighteen-headed Bandage has been thus applied, you are next to lay two Compreſſes, one on each Side the Tibia, to whoſe Length they ſhould be equal, and two or three Fingers Breadth, folded together towards the Ancle, as we obſerved in Chap. VII. Sect. X. See *Tab.* IX. *Fig.* 13. But they ſhould be firſt dipped in warm Spirit of Wine, or *Oxycrate*. Then impoſing them on each Side the Tibia upon CCC, and DDD *Fig.* 25. *Tab.* XXXVIII. you place the ſix largeſt Leaves of the laſt Order over them, marked EE, FF, GG, beginning, and proceeding in that Order. Two other Compreſſes are then impoſed with a Splint of ſtiff Paſteboard, which are tied cloſe round the Tibia by three Tapes, before placed under it for that Purpoſe, making your Knots on the Out-ſide of the Leg.

Poſture of the Leg after Deligation.

V. The Deligation being thus compleated, the Leg muſt now be diſpoſed to reſt in the moſt convenient Poſture, as in ſimple Fractures. For this End the Ancients faſtened a Pillow round the Leg, as may appear from the Figures and Writings of SOLINGEN, PURMAN, and others. But as their Method of retaining the Leg is not ſufficiently firm and ſecure, it is more adviſeable to uſe the Straw-caſe often mentioned, and deſcribed in Chap. VII. Sect. IX. And, for the reſt, with regard to the quiet Poſture and Support of the Foot and Heel, they muſt be conformable with what was before propoſed in the Deligation for a Fracture of the Femur, Chap. VII. Sect. II. as deſcribed in *Fig.* 20. of Plate XXXVIII.

Renewal of the Dreſſings.

VI. After the ſecond Day it will be neceſſary to renew your Dreſſings and Deligation daily, or every other Day, according to the Quantity of Matter diſcharged. While you are performing this, the Leg muſt be diſcreetly and firmly held up by an Aſſiſtant, ſo that the Fragments and injured Parts may not

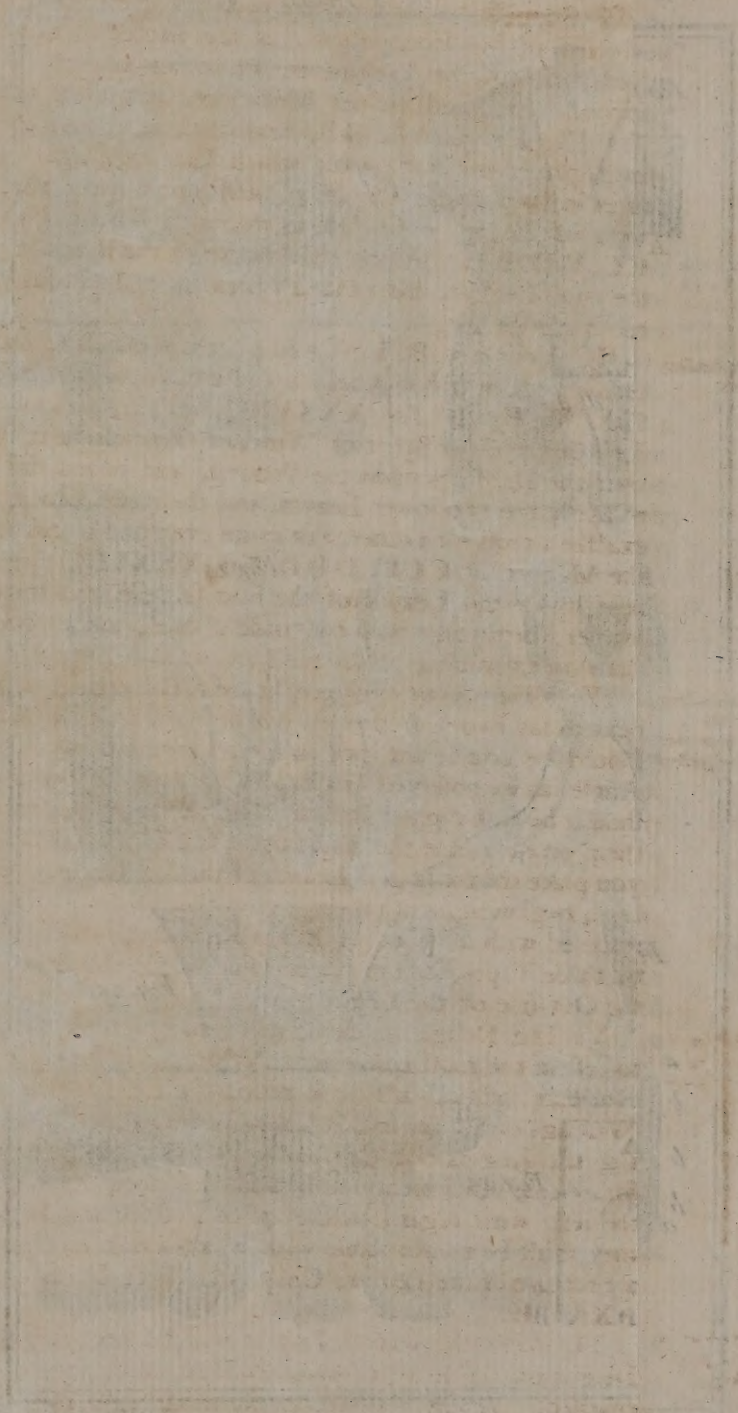

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

Fig. 10.

Fig. 11.

Fig. 12.

Fig. 13.

Fig. 14.

Fig. 15.

Fig. 16.

Fig. 17.

Fig. 18.

Fig. 19.

Fig. 20.

Fig. 21.

Fig. 22.

Fig. 23.

Fig. 24.

Fig. 25.

J. Mynde sc.

not be disturbed. After cleansing and dressing the Wound, the rest are to be applied as before at Sect. III, *& seq.* Which Process must be repeated till the Wound is healed: and if that should happen before the bony Fragments are well united, it will be convenient to apply a common Bandage, or Roller, as in simple Fractures. Clean Bandage and Dressings must be applied with Care when the others are foul. As for retaining the Leg in the wooden Case of SCULTETUS, *Tab.* LVI. that is less used, and more unhandy, than the Straw-case, especially in Camps, where these Fractures are very frequent, otherwise it is no despicable Machine.

Machines for a fractured Tibia with a lacerated or contused Wound

VII. As for compound Fractures of the Leg, in which the Bone is much splintered, or the Wound greatly contused, or lacerated, it will be necessary to keep the Limb more exactly steddy, and at rest, than the Straw-case will admit of. Surgeons have therefore contrived a Machine peculiarly adapted to the Purpose, and consisting of three Brass-plates joined together by Hinges, *Tab.* IX. *Fig.* 9. which are to be applied together with the Foot-board, *Fig.* 6, 7, and 8: though there are some, who, notwithstanding, prefer the Straw-case even before this. But we are furnished with a much more laudable and curious Machine contrived for this, and other Fractures, by the ingenious Mr. PETIT, of which we find an accurate Description and Figure in the History of the Royal Academy of Sciences at *Paris*, for the Year 1718, as also in its Author's Treatise on Diseases of the Bones. We have given you the Figure and Description of its several Parts in our *Tab.* IX. *Fig.* 11, and 12; and in Chap. X. Sect. II. of our Book on *Fractures*, we have considered it at large [a].

Treatment of other compound Fractures.

VIII. Lastly, for a Fracture of the Thigh with an external Wound, you must apply the same eighteen-headed Bandage we have now described for the Tibia; only here both it and the Straw-case must be proportionably larger [b]. For the rest, though a Compound Fracture of the *Humerus*, or *Cubitus*, may be commodiously enough invested with this eighteen-headed Bandage, yet we generally make the same Deligation here as in simple Fractures of those Parts; because the Bones, being pendulous, are more commodiously invested, and better secured by the Roller, than by the Bandage with eighteen Leaves. And thus have we, through the Blessing of God, finished that most necessary and important Branch of Surgery, the Application of Bandages, and at the same Time brought our Chirurgical System also to a Period; being satisfied that if what is here proposed be well understood, the Operator will be thereby easily enabled to invent others for any particular or uncommon Case that may come under his Care.

An EXPLANATION *of the* THIRTY-EIGHTH PLATE.

Fig. 1. Shews the Bandage for an Amputation of a cancerous Breast: in which A B C D denote the first Course of the Roller, E E the Compresses on the Dressings.

[a] We have a remarkable Fracture with a Wound described by VERDUC in his Treatise on Bandages, Chap. 44. and in SCULTETUS, Obs. 82 and 84.

[b] Observations on a Compound Fracture of the Thigh, are given us by SCULTETUS, Obs. 77 and 78.

Fig. 2. Repreſents the Method of applying the T Bandage of HELIODORUS for Diſorders of the Breaſt: *a a* the tranſverſe Part which goes round the Thorax under the Breaſt; *b b* the two Ends of it ſlit, or perpendicular Part going over the Shoulders, and the Part covering the Breaſt; *d* the Neck intercepted by the Slips *b b*.

Fig. 3. Denotes the four-headed Bandage for Diſorders of the Breaſt: *a* the entire Part of it laid over the Breaſt, *b b* its two upper, and *c c* its two lower Heads, which are tied together near the ſound Shoulder *d*.

Fig. 4. Repreſents the *Quadriga* Bandage for inveſting the Thorax: in which *a b c d e f g*, denote the firſt and ſucceſſive Turns of the Roller, deſcribed at large in Chap. IV. Sect. XIV.

Fig. 5. Gives a View of the Bandage for an *Omphalocele*, or umbilical Rupture. A the Compreſs preventing an Extruſion of the returned *Omentum* and Inteſtines; B B the Girdle Part that inveſts the body; C the Scapulary ſuſtaining the former; *d d* two Slips of the Bandage which, paſſing betwixt the Thighs, are carried round the Nates, and faſtened to the Belt near the Hips at B B, that the Compreſs may not recede either above, or below the Navel.

Fig. 6. The Bandage for the Inguen; *a a* going round the Body *b b* betwixt the Thighs and *c* inveſtigating the Inguen, as you may alſo obſerve in

Fig. 7. The ſame inguinal Bandage applied to the Body.

Fig. 8 and 9. Shew the Bandage for inveſting the Scrotum: *a a* the tranſverſe Part that goes round the Body: *b b* its perpendicular Part ſlit in the Middle, and perforated by the Aperture *c* to tranſmit the Penis, *Fig.* 8. ſhews it faſtened to the Body.

Fig. 10 and 11. Are different Forms of the double T Bandage for various Uſes.

Fig. 12. Shews the laſt of them applied to the Body for inveſting the Scrotum.

Fig. 13. Exhibits a Compound Bandage for the Scrotum, termed the *Suſpenſor*, and by the *French*, *La Bourſe*: A A the Part which receives the Scrotum like a Purſe. B B B the Girdle Part for inveſting the Body, C the Aperture to tranſmit the Penis, D D the two Heads which paſs betwixt and round the Thighs, and are faſtened upon the Hips by the Holes *d d*, with the Strings E E.

Fig. 14. Shews the Method of applying the T Bandage, *Fig.* 11. for Diſorders of the Anus: *a a* the tranſverſe Part faſtened round the Body; *b* the unſlit End of the perpendicular Part retaining the Dreſſings on the Anus, joined to the other Part by the Suture *c c*; *d d* the lower Ends paſſing betwixt the Thighs, and faſtened before at the Pubes, or each Inguen, as in *Fig.* 12.

Fig. 15. Repreſents the double and knotted Bandage for each Inguen, ſerving many Uſes, and eſpecially to reſtrain the Bleeding after Lithotomy, or Syringotomy: its Application is deſcribed at large in Chap. V. N. VII. *a b c d e f g* ſhew the principal and ſucceſſive Turns in it, and the dotted Lines croſſing the Abdomen from *a* to *h*, and *g* to *i*, denote two Rounds under the Perinæum, and over the Shoulders, to compreſs the Parts more effectually.

Fig. 16. Is the *Faſcia inguinalis ſimplex*; which beginning at *a*, goes in the Courſe *b b* to *c*, and thence by *d e* to *c*, and again to its Origin *a*.

Fig.

Fig. 17. Repreſents a fractured Arm A, ſecured with Splints and Compreſſes *a a a* tied over the Bandage by the three Strings *b b b*, with Knots on the Outſide of the Arm, and ſuſpended by the Sling or Napkin about the Neck *c c c c*, tied in a Knot on the ſound Shoulder *d*, and ſuſtaining the Paſteboard Caſe *e e*, for a Fracture of the Cubitus; which laſt is unneceſſary for a Fracture of the Humerus.

Fig. 18. Shews the Bandage for inveſting a burnt, or ſcalded Hand; the Application of which is deſcribed in Chap. VI. Sect. XI. preceding.

Fig. 19. Repreſents the Manner of binding up a Stump of the Cubitus, after amputating the Hand. A A the Arm and Part of the Cubitus; *a* the Stump dreſſed; *b b* the two Roller-heads carried round the Compreſſes in the Circle *c*, and then croſſed over the End of the Stump *d*, as in the Capeline, or Reflex-bandage.

Fig. 20. Exhibits a Straw-caſe, and the Manner of fixing it to the Leg: AAAA are two cylindric Bundles of Straw, with a Stick in the Middle of each; B B the ſubjacent Pillow; C the Foot-board; *a b c d* four Tapes by which the whole is tied faſt to the Leg by as many Knots on the Outer-ſide; *e f* the two Ligatures with which the Foot-board is faſtened to the Straw-cylinders on each Side in a croſs Direction; *g* the uppermoſt Ligature of the Footboard faſtened a little higher to the outer Cylinder.

Fig. 21. Is a double-headed Roller, ſewed together at each End ſo as to leave an Inch Space in the Middle *b*, for ſuſtaining the Heel and *Tendo Achillis* in Fractures.

Fig. 22. Exhibits the Deligation for a tranſverſe Fracture of the Patella: *a* the Patella; *b* the Thigh; *c* the Leg; *d e* the Turns above and below the Patella like a Figure of 8, croſſing in the Ham.

Fig. 23. Gives the Shape of a Linen-compreſs, to draw and keep down the ſuperior Part of the Patella in a tranſverſe Fracture of it, as in Chap. VII. Sect. VII. preceding.

Fig. 24. Shews the Deligation to be applied for Phlebotomy, a Fracture or Luxation of the Foot: A the circular Rounds above the Ancle; B the ſpiral and circular Turns about the Tarſus and Metatarſus.

Fig. 25. Teaches the Method of inveſting a compound Fracture of the Tibia, with the eighteen-leaved Bandage. A the Thigh; B the lower Part of the Leg; CCC, DDD the oblique Poſition of the Leaves a-croſs each other upon the Fracture; E F G the ſix outermoſt Leaves to be applied over the Compreſſes obliquely in that alphabetical Order as they are marked.

An EXPLANATION *of the* THIRTY-NINTH PLATE.

We have here a new Kind of Lever from PETIT, for elevating the fractured and depreſſed Bones of the Cranium, which he has deſcribed and delineated in the *Memoirs of the Chirurgical Academy at* Paris, Tom. I. 1743. p. 302. It conſiſts of two principal Parts; namely, the Lever itſelf, and the Fulcrum, which the Mechanics call an Hypomochlium or Roller.

Fig. 1. Exhibits the Lever, about eight Inches in Length, four or five Straws in Breadth, and in Thickneſs two. It is made ſtrait, excepting a ſmall Curvature at

at the Point ABC, called the ſhorter Branch, which is ſomewhat narrower, taperer than the other Parts, that it may enter more commodiouſly under the fractured Bone. This Curvature has alſo ſome tranſverſe Notches in the upper Part (See *Fig.* 3. AC,) to keep the Lever from running too deep under the fractured Bone, and thereby injuring the Dura Mater, or even the Brain. The oppoſite Part of the Point (*Fig.* 1. C.) is roundiſh and ſmooth, to prevent the like Injuries in its Introduction.

The other Part of this Lever, called the longer Branch, in its Surface DE, which is the loweſt, is perforated in the Middle with ſome ſmall Holes lengthways, about two or three Lines diſtant from each other, to receive the Screw of the Fulcrum, (*Fig.* 2. A.) that the Surgeon may at Pleaſure draw it nearer to the Curvature A B C. (*Fig.* 1.) or remove it further from it.

Hence it has this Convenience, that the Fulcrum may be fixed nearer to, or more remote from, the Fracture; and conſequently have a greater or leſs Force given it, as the Caſe requires. The Handle F is made of Wood.

Fig. 2. Is the other Part of this Lever, which he accounts the principal, and is, according to Mechanics, the Fulcrum for ſuſtaining it in raiſing a Weight. A is the Screw, which is fixed in one of the Holes in the Lever (*Fig.* 1. DE.) as the Surgeon thinks proper. This prevents the Lever's receding from its Fulcrum, which might be attended with very bad Conſequences. The Part, which is towards the Cranium, is formed like an Arch, (*Fig.* 4. BCB.) that it may not reſt upon the Cranium, but at the two Extremes D D, which for many Reaſons ſhould be made broad enough and covered with a ſoft Leather.

Fig. 3. Shews you the two Parts together. AB, is the Curvature; C the Notches; D the Place where the Fulcrum is joined to the Lever; EDE, the longer Branch; F the wooden Handle; GG the two Legs, on which the Fulcrum reſts.

Fig. 4. Repreſents another larger Fulcrum, which he adviſes to uſe in more violent Fractures, where the other is too ſmall to anſwer the Intention. A is the Screw, and BCB, the Arch, as in the other, *Fig.* 2. DD. And here both Ends are perforated with ſmall Holes, that the Pillows underneath may be fixed more commodiouſly on each Side with a Needle and Thread. But here we muſt obſerve, that PETIT prefers his own Lever to all others that were invented by his Predeceſſors, and makes not the leaſt mention of that antient and excellent Lever of HILDANUS, delineated by him *Obſ.* 4. *Cent.* III. and which I recommended and delineated alſo with Improvements above thirty Years ago: whereas this is full as uſeful, if not preferable to his. He moreover finds fault with the three-footed Lever, that it is of no Uſe, where there is no Aperture, or but a ſmall one in the Fracture; and therefore prefers his own. But he has not ſhewn us, nor indeed can I diſcover, how his Lever, which is none of the ſmalleſt, can be introduced in a ſmall Aperture. But HILDANUS's and mine may be uſed, where there is no Aperture, as they are furniſhed with a Trepan; and therefore are by no Means inferior to his.

Fig. 5. Repreſents a very peculiar Method in which a Woman's Arm was cut off by my Direction, that had been burnt quite to the Breaſt, and even to the Bones.

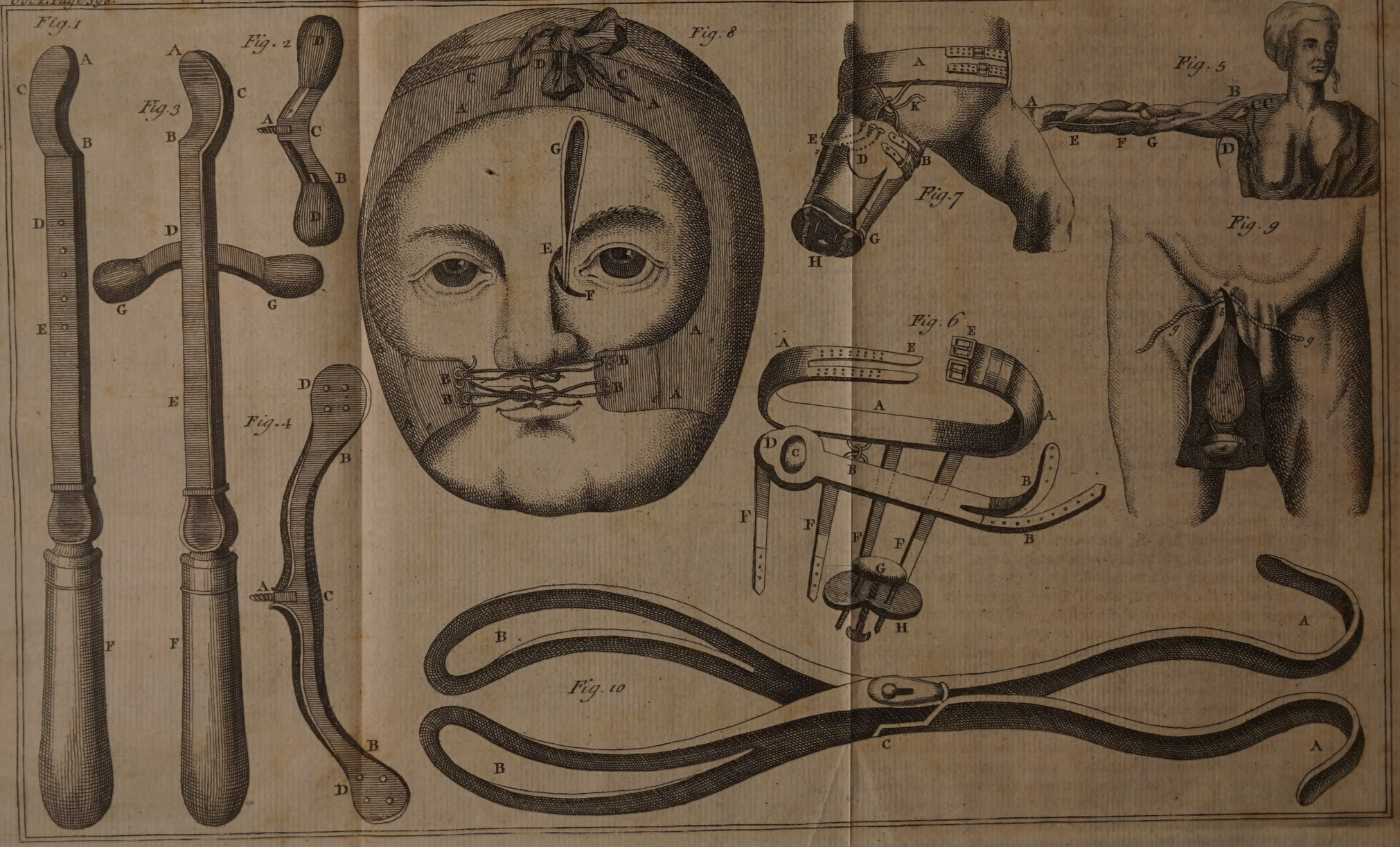
Fig. 1
Fig. 2
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Fig. 8
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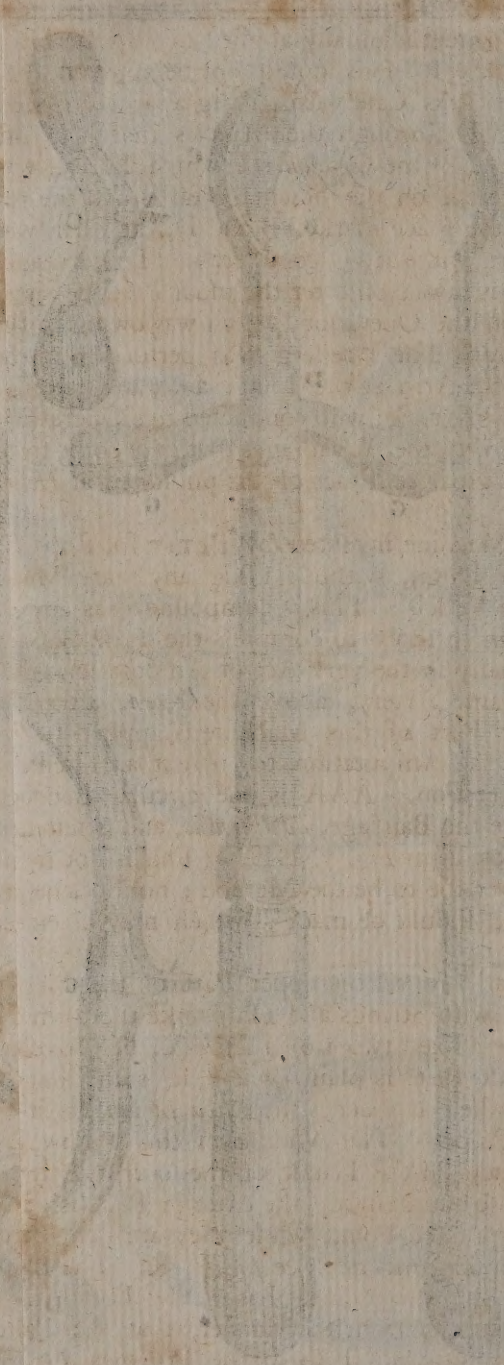
Fig. 6
Fig. 10



Bones. A B ſhews the right Arm burnt quite up to the Neck and the upper Part of the Breaſt, (C C) that all the Skin, and the greateſt of the Muſcles of the Arm were conſumed to the Bones. Hence it was to be amputated juſt under the Joint, and where the Tournequet is uſually applied to ſtop the Hæmorrhage; but which for very weighty Reaſons could not be applied here. We therefore begun our Treatment of this Caſe with paſſing a large crooked Needle with a ſtrong double Thread (D) through the Muſcles that had loſt their Integuments, juſt below the Head of the *Os humeri*; which Thread was there faſtened, to make a ſtrong Ligature on the brachial Veſſels and the remaining Fleſh. Then, a little below the Place marked B and D, the Fleſh was cut off with a Scalpel quite to the Bone, without any conſiderable Hæmorrhage. The Fleſh thus removed, the Bone was ſawed off after the uſual Practice; and but a ſmall Efflux of Blood enſued on the Operation, which was owing to the Ligature before made on the Artery. The Dreſſing was performed in the ſame Manner, as in Amputations of the Arm at the Joint; and the Cure ſucceeded happily. My Friend ELIAS FREDERIC, who conducted this Operation, has given a full Account of the Caſe, with the Advantages that may come from this new Method of amputating, in a ſeparate Tract of his publiſhed at *Helmſtadt*, An. Dom. 1739.

Fig. 6 and 7. Repreſent another new Machine invented by PETIT for ſtopping the Blood in the Amputation of the Thigh, without uſing any ſharp Medicines, Cautery, or Ligature of the Veſſels. This is compounded as it were of two ſmaller Machines: one of which ſerves to compreſs the Trunk of the crural Artery, near the Groin, eſpecially in the very Act of Amputation; the other, to perform the ſame on the ſame Artery, above the Knee, after the Operation. The firſt and ſuperior Part of this Machine is applied to the Body, by way of Tournequet, before the Amputation, to prevent an Hæmorrhage in the Artery during the Operation. AAA is the circular Bandage which goes round the Abdomen, like the Bandage, *ad Hernias*, and is faſtened at the Side by two Strings and Haſps, as in *Fig.* 7. E E. (This is not mentioned by the Author, but it appears to me to be the Method; nor does he inform us of what Stuff the Bandage ſhould be made; which may be either Leather or Callico.)

B B, Another circular Bandage, is drawn round the upper Part of the Thigh, juſt below the Groin, and faſtened with Strings and Haſps like the former: where to one End of the Bandage are affixed two iron Plates (C, D,) covered with a ſoft Leather. The undermoſt Plate is plain, where it is in Contact with the upper and exterior; but where it touches the *Plica Inguinalis*, it is furniſhed with a hard well-ſtuffed Pillow. The Middle of this Pillow (*c*, *Fig.* 6.) is placed with great Accuracy on the Trunk of the crural Artery, where it paſſes from the Abdomen into the Femur: the exterior Plate is joined to both Bandages, and ſerves for a fixed Point, while they are connected to each other by Tapes or ſome ſuch Ligaments. See *Fig.* 7. K. The Bandage on the Loins hinders it from falling down, and that on the Thigh from ſliding up; they both together ſuſtain it in ſuch a Manner, that the Plate and Pillow C are kept fixed and immoveable. E ſhews the Trochlea *Fig.* 7. which paſſes through the Screw-hole of the upper Plate to the Middle of the lower;

lower; which if you turn to the right, the two Plates recede from each other; if to the left, they are drawn together. But whether they are drawn to or from each other, to keep them always parallel in a right Line, there are two ſmall ſteel Cylinders (N° 1. and 2.) affixed in the lower Plate, which are raiſed perpendicularly, and paſs through correſponding Apertures in the exterior Plate, one on the right Side of the Trochlea E, and the other on the left.

In the Application therefore of this Machine, when the Trochlea is turned to the right, theſe Plates recede from each other. But, as the two Girts or Bandages confine the upper Plate and reſiſt its riſing, the under-one with its hard Pillow muſt neceſſarily be forced inwards to the *Plica Inguinalis*, and ſo compreſs the *crural* (or *femoral*) Artery more or leſs, in Proportion as you wind the Trochlea; that at laſt no more Blood can paſs through it to the Knee.

Thus far this Part of the Machine has performed its Office during the Operation. But, to reſtrain the Bleeding after the Artery has been divided, our Author has contrived another, which conſiſts (much like the former) of two iron Plates. For from the upper and larger Girt round the Loins, there deſcend four narrower Strips, which are ſtrongly ſupported by the two circular Bandages of the former Part. But, before theſe Slips are faſtened at their other End, a Pellet of Lint is applied to the divided Artery ſufficient to compreſs it; not directly againſt the Wound of the Artery, but on one Side of it, and that the Inſide of the Thigh, at the greateſt Diſtance from its Bone: that ſo, when it is preſſed againſt the *Os femoris*, the Sides of the open Artery may be cloſely conſtringed. Over this Lint-pellet you muſt place another, ſomewhat larger; and on that a third, or fourth, if there be Occaſion, each ſtill larger than the preceding; all of them preſſed againſt the Thigh-bone, in the ſame Direction, as above. Then the Center of the Plate furniſhed with the hard Pillow (*Fig.* 6. G,) is applied to the laſt Pellet, and faſtened by the four deſcending Strips F F F F, which are all fixed in the Haſps of the exterior Plate H. If then the Trochlea H, *Fig.* 6. be turned to the right, the Plates will recede from each other. But, as the four deſcending Strips reſtrain the exterior Plate from giving way downwards, the interior, or that next the Wound, is forced toward the Wound, and, the Lint-pellets; which there concur with joint Forces to compreſs the Artery in ſuch a Manner, as to prevent an Hæmorrhage.

This lower Part of the Machine being thus properly applied, the Trochlea E, *Fig.* 7. ſhould be a little relaxed, till the [a] Pulſe of the Artery is juſt perceptible: but if the Pulſe be ſtrong, it is a plain Indication that the Blood runs too freely into the Artery; the Trochlea therefore muſt be again wound up, a Turn or two, till it appear from the Pulſe being moderated, that the Influx of the Blood is greatly diminiſhed. So the firſt Part of the Machine not only reſtrains the Hæmorrhage powerfully during the Amputation, but when it is over, ſerves alſo to moderate the Influx of the Blood into the inciſed Artery: and the latter compreſſing the Artery checks the Efflux through

[a] But our Author does not inform us, how we ſhall perceive the Pulſe of this femoral Artery, nor can I poſſibly gueſs; eſpecially as the Thigh is ſo ſurrounded with the Apparatus, and the Artery covered partly with ſteel Plates and partly with Leather, which can ſcarce be perceived in the naked Thigh, when in Health and Vigour.

the

the Wound, and at the ſame Time promotes its healing. —— As ſoon as a Suppuration is formed, he aſſures us that the whole Apparatus may ſafely be removed at every Dreſſing, without any Danger of an Hæmorrhage: which is far from being the Caſe in the other Methods of Practice. He moreover declares, that by the Aſſiſtance of this Machine, there is no fear of a Bleeding, even at the firſt Dreſſing, if the ſuperior Trochlea E be wound up a little. And he affirms that, by Degrees, the Trochlea may be relaxed more and more at every freſh Dreſſing, only changing the Lint Pellets, if there be Occaſion; and that by this Method the Wound would be effectually healed and conſolidated. The Author declaims ſtill more largely on the Excellencies of this Machine; for which I refer you to his *Amſterdam* Edition, p. 138 *& ſeq.* But in many Places, as I have obſerved before, he is too conciſe, and conſequently obſcure, though otherwiſe a very learned and ingenious Writer.

In *Fig.* 8. AAAA Exhibit a particular Machine or kind of Fillet, which I have frequently uſed in curing obſtinate Hare-lips: which Fillet it applied to the Infant's Head before we enter upon the Inciſion, and by means of the Tapes C C, wound about the Head and tied with the Knot D, is well ſecured and faſtened at the Forehead. Then the Cutting and Suture is performed in the Manner we before adviſed, Chap. LXXIV. But more effectually to conjoin ſuch Hare-lips as have a very large Aperture, I have added to theſe Fillets near the upper Lip of each Side a Proceſs of a proper Size (B B, B B,) furniſhed each with two Hooks: through one of which upper Hooks (after having applied externally to the Wound Honey of Roſes or ſome vulnerary Balſam) I paſs a ſtrong ſilk Thread; which I then draw to the oppoſite Side, and conſtringe the Lips firmly. From thence I return to the former, and repeat it two or three Times; I then deſcend to the lower Hooks, and do the ſame there; carefully obſerving that the Lips be drawn cloſe. And having left the Threads there for four or five Days, I cut them with a Pair of Sciſſars: but I ſtill leave the Needles with their Threads; one of which I cautiouſly extract the next Day, and in a Day or two the other. If there are three, the third is likewiſe extracted the Day after. And, laſtly, I apply a healing Plaſter for ſome Days, till the Wound is conſolidated.

In the ſame Figure it repreſented the Method of treating the *Fiſtula lacrymalis:* which he mentions, as entirely new, and preferable to all other Methods. The Cauſe of it he allows, with ANELLIUS and myſelf, to be an Obſtruction of the Naſal Duct, though he ſuppreſſes our Names He then goes on in propoſing the Cure: "To open the obſtructed Duct, I only make an Inci- "ciſion in the lacrymal Sack (which he delineates in the ſame Manner as "I have *Fig.* 8. E, F,) I then introduce (ſays he) a grooved Probe, and "protrude it into the Noſe, (the ſame as mine G,) and thus I open the "Duct: I paſs afterwards a Wax-candle (*une Bougie*) through the Aperture "I had made, and by this Means keep it open. This *Bougie* I change every "Day, and leave it off, when I find the internal Surface of the new Paſſage "healed. Thus the Tears through this Duct eaſily recover their natural "Courſe from the Eye to the Noſe, and the external Wound heals in two or "three Days."

Here again our Author is more ſtrangely obſcure and defective. For, firſt, he has been very deficient in the Deſcription of his Probe: The Conformation of which it is neceſſary to know, if we would profit by his Account, and particularly the Size of the Probe itſelf, and of its Point; which if too fine, would be inſufficient to perforate the Duct when ſtrongly concreted; if too thick, could by no means be introduced. Nor (2.) can the Size of the Groove for paſſing the *Bougie* be diſcovered from his Figure, being concealed in the Duct: for if it is not larger within than as he has delineated it near the lacrymal Sack, I cannot conceive how it ſhould hold the Candle, as it will hardly admit even a Hog's Briſtle. Nor (3.) does he mention the Thickneſs of his *Bougie:* nor indeed what his Probe is made of, whether Silver or Steel, *&c.* for if of Silver, and ſo fine, as it is delineated at the lacrymal Sack, it is much too weak to perforate the Duct, and of Conſequence liable to be bent in the Operation. And (4.) he has not told us, how long the new Aperture is to be kept open and the Candle retained in it, nor what Medicines applied to promote and perfect the Cure; which is rarely effected under a long Time, as I have too often experienced. For I have myſelf, for thirty Years and upwards, been concerned in the Cure of lacrymal Fiſtulæ, and thoſe not of the moſt malignant; which I treated much in the preceding Manner, but with a ſolid Probe (as Plate I. K.) I then introduce a *Bougie*, about the Bigneſs of a moderate Straw, or a leaden Pin of the ſame Size, and retained them in the Duct for many Days, and ſometimes many Weeks: but it was generally a long Time ere I could keep it open. Nay, in ſome Caſes, I could not effect it by any Means; neither by Candles, nor Tents, nor the leaden Probe: for after keeping it open even for Months, upon healing the external Wound this new perforated Duct grew together again but a few Days after. So far is that Aſſertion of PETIT's from being generally true, which he ſo roundly delivers: "*That there was Nothing to be done, but juſt to open the Duct with a Probe,* "*and the Tears would very ſoon, and with great Eaſe, recover their natural Courſe* "*from the Eyes to the Noſe.*" A bold Aſſertion this; and which, if credited, will often deceive both the Practitioner and Patient, as I am well aſſured from repeated Experience.

Fig. 9. Demonſtrates the Method of curing Hernias of the Inteſtines without Caſtration; which indeed I have deſcribed long ſince in my Surgery: but as VOGELIUS, a famous Surgeon at *Lubeck*, has illuſtrated this Method with a Plate, I have borrowed it from him.

a points out the Situation of the abdominal Ring, through which, in Hernias, the Inteſtines with their Sack prolapſe into the Scrotum; *b b* the Integuments laid open, to diſcover the Hernious Sack, and particularly its upper Part, on which the Ligature is to be made; *c c* the Scrotum opened to ſhew the lower Part of the Sack, and the Teſticle beneath.

d the Sack itſelf fallen quite into the Scrotum, in which are contained the prolapſed Inteſtines or *Omentum*, or both; which takes its Riſe from the interior Lamina of the Peritonæum protruded through the abdominal Ring; *e* the Teſticle, and a little above, *f* its ſpermatic Veſſels; *g g* the String by which the Ligature is made upon the Sack, the Inteſtines and *Omentum* being returned.

Figure I.

Figure II.

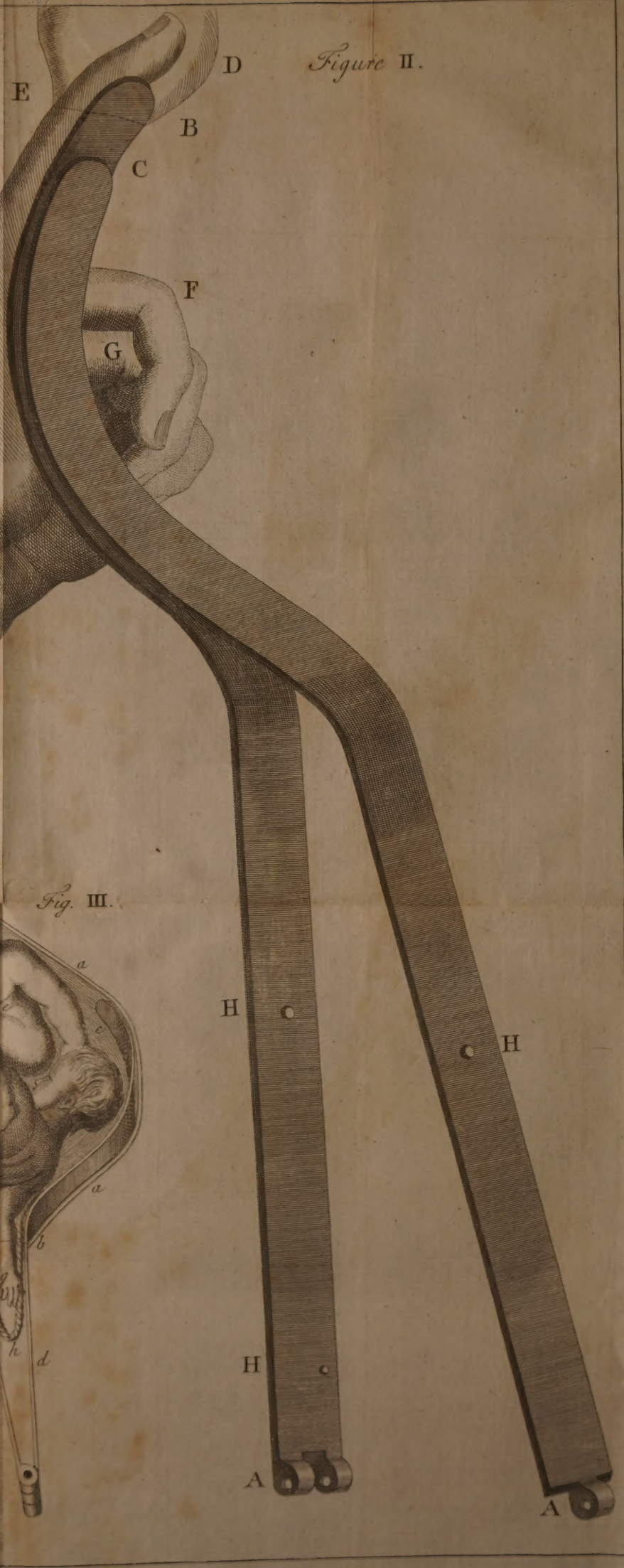


Fig. III.

Fig. 10. Exhibits the *Engliſh* Forceps, for extracting out of the Uterus the Fœtus when wedged in by the Head; the Hint of which Invention was taken from PALFINUS's Hooks, firſt deſcribed and delineated by me, Plate XXXIII. *Fig.* 16.

AA are the two Hooks or Cheeks; C the Joint which connects them, and where I disjoin them on their Application. Thus they are to be introduced one after another on each Side of the Infant's Head; then joining them again, you take faſt hold of the Head, and extract the Fœtus. With one Part of theſe Forceps I turned the Head of a Fœtus into its natural Situation, which had been inclined to one Side, and had ſtuck ſo two Days in a difficult Birth; and by this Means extracted it alive. If you uſe one Side of them in an inverted Manner, A may ſerve for the Hook left in the dead Fœtus, and B for the Handle.

An EXPLANATION *of the* FORTIETH PLATE.

This Plate is taken from a Treatiſe of the famous SCHLICTINGIUS of *Amſterdam*, where he has deſcribed an Inſtrument, with which the celebrated ROONHUYS delivered many Women with Succeſs in difficult Births. He aſſures us that the *Os Uteri* and *Uterus* itſelf is dilated more ſpeedily and with leſs Pain by this Inſtrument than any other, and the Fœtus thereby quicker and eaſier extracted.

Fig. 1. Is the Inſtrument. AAAAAA are its two ſteel elaſtic Laminæ, near two Spans long, one Finger broad, and about half a Line in Thickneſs. One of theſe Laminæ, and that the loweſt and largeſt D D is ſtrait and ſomewhat thicker than the other: Which (marked B B and F F) is thinner, curve and luniform; that, with the concave Part, it may be accommodated to the internal Sides of the *Uterus*, and the convex to the Fœtus juſt as the Circle is more or leſs compreſſed or diſtended.

B B two Hemicycles, or oval Arches, elaſtic, and oppoſite to each other, for the more commodious Extraction of the incuneated Fœtus.

C the Ginglymus Connection by which the lower Parts of the Laminæ are joined together, by Means of a cylindrical Pipe for the Extraction of the Infant.

D D D D the Thickneſs of the Plates both in the upper incurvated and the lower ſtrait Parts.

E the Pin which enters the Cavity of the Cylinder C, to connect the two Plates by Way of Ginglymus. This Pin may be made either of Steel or Wood.

F F their external Sides; G G internal.

H H ſhew the Place, where one or more Fingers may be introduced occaſionally between the two Plates to ſeparate them more or leſs from each other; which, when removed, they are eaſily cloſed.

I I the Space, in which the Head of the Fœtus or any other round Part may be retained between the Laminæ.

Fig. 2. Repreſents the ſame Inſtrument, with the Plates aſunder, the Joint Ginglymus A A being looſed; where one Plate is conducted over the other (B C) by the Fore-finger of the left Hand D, through the *Os Uteri* E, into the *Uterus* itſelf.

itſelf. F the Middle-finger of the Left-hand. G the Thumb-knuckle of the ſame.

H H H the Holes, by which the Covering (either of Leather or Callico) is faſtened to the Plates, to keep it tight in the Extraction of the Inſtrument.

Fig. 3. Exhibits Twins in an oblique-figured Womb; which, the Waters being broke, is exceſſively contracted, and confines the Fœtus in a perverſe Situation. SCHLICHTINGIUS tells us that this Figure was never before delineated *accurately*; and that this is one of the moſt difficult Caſes in the whole Art of Midwifery.

By *a a a a a a* is repreſented the oblique and male-figured Uterus, where there are Twins perverſely ſituated, and wedged in by the Contraction of the Uterus, whoſe oval Shape is deſtroyed and rendered uneven by its gibbous Prominences.

b b ſhew the external *Os Uteri*, a little diſtended by ROONHUYS's Inſtrument.

c c are the Curve-ends of this Inſtrument round the incuneated Twins, where they are paſſed between the *Uterus* and Fœtus.

d d are the ſtrait Parts of the Inſtrument, which appear out of the Uterus, and are ſomewhat opened.

e e the Twins in their unnatural Situation, ſqueezed as it were in a Heap; one of which is repreſented a little larger than the other.

f f two *Placentæ Uteri*; *g* a Hand of one of the Infants protruded through the Vagina; *h* one of the Navel-ſtrings hanging out of the *Uterus*.

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